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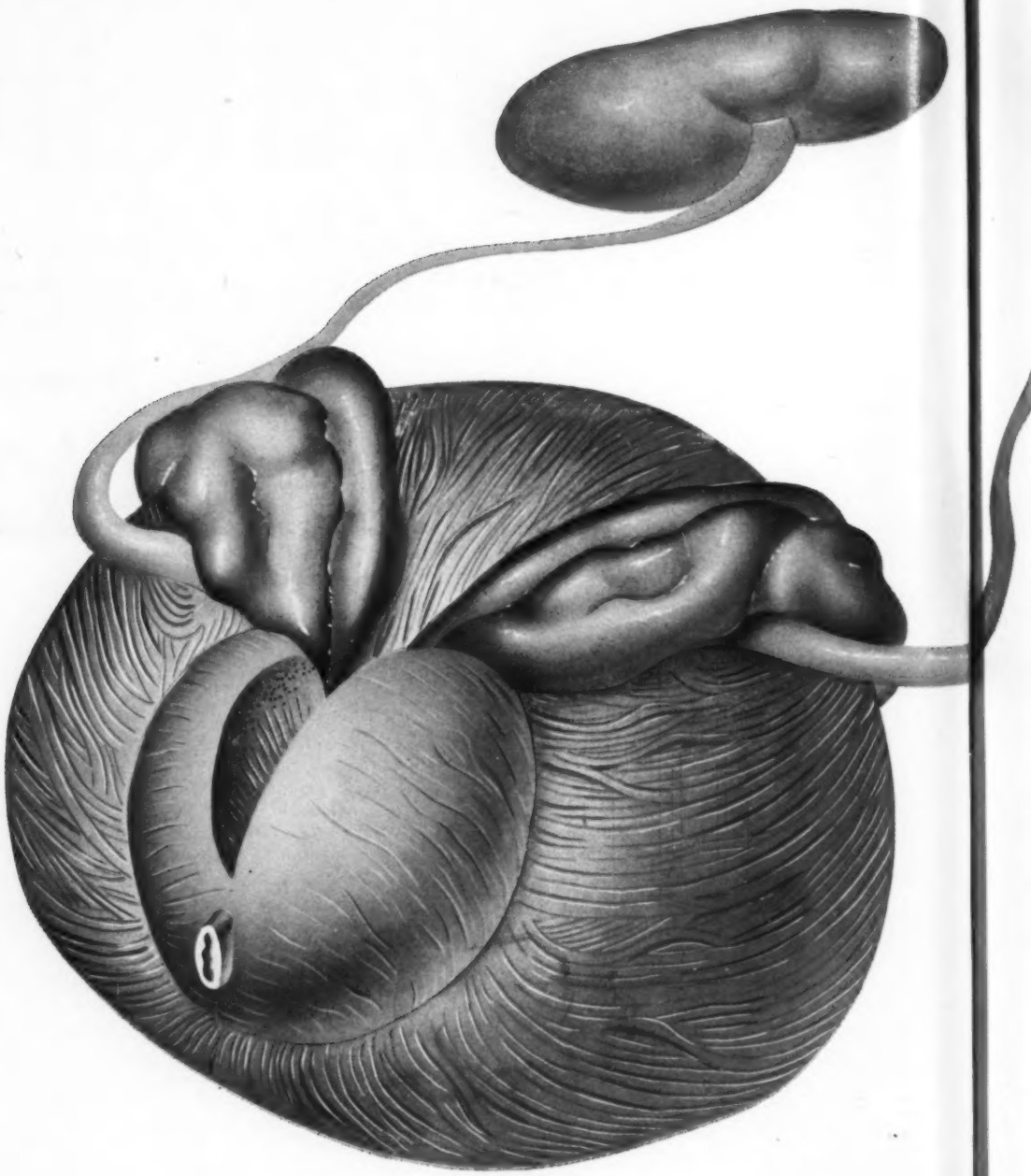

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References (1) Jones, C. P.; Carter, B.; Thomas, W. L., & Creadick, R. N.: *Obst. & Gynec.* 5:365, 1955. (2) Balch, H. H.: Mil. Surgeon 115:419, 1954. (3) Altemeier, W. A.; Culbertson, W. R.; Sherman, R.; Cole, W., & Elstun, W.: *J.A.M.A.* 157:305, 1955. (4) Kutscher, A. H.; Sequin, L.; Lewis, S.; Firo, J. D.; Zegarelli, E. V.; Rankow, R., & Segall, R.: *Antibiotics & Chemotherapy* 4:1023, 1954. (5) Clapper, W. E.; Wood, D. C., & Burdette, R. I.: *Antibiotics & Chemotherapy* 4:978, 1954. (6) Sanford, J. P.; Favour, C. B.; Harrison, J. H., & Mao, F. H.: *New England J. Med.* 251:810, 1954. (7) Sanford, J. P.; Favour, C. B., & Mao, F. H.: *J. Lab. & Clin. Med.* 45:540, 1955. (8) Felshin, G.: *J. Am. M. Women's A.* 10:51, 1955.

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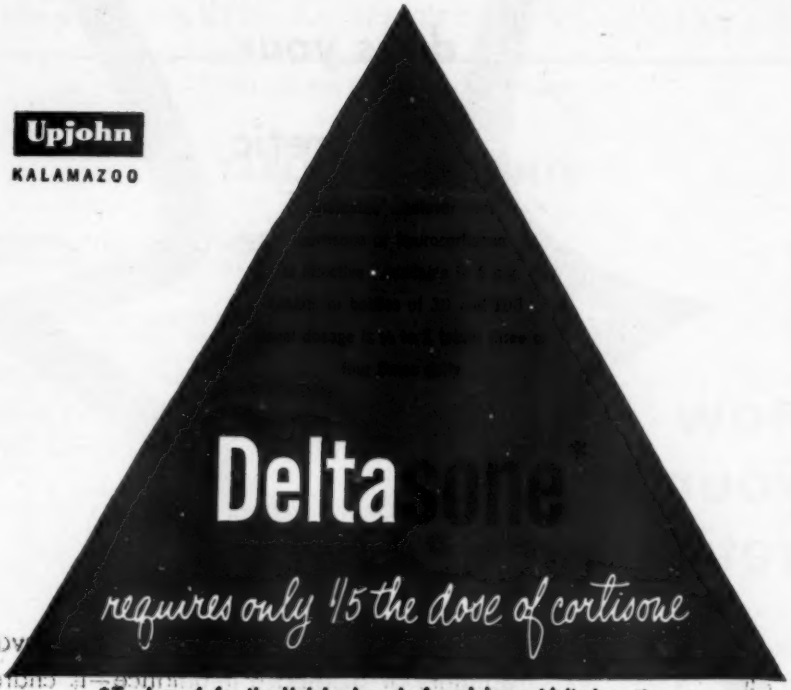

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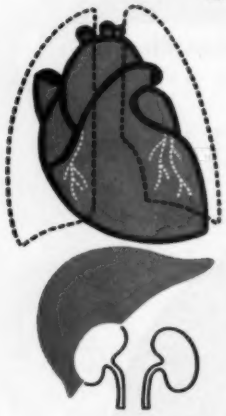

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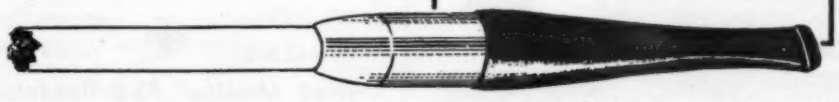

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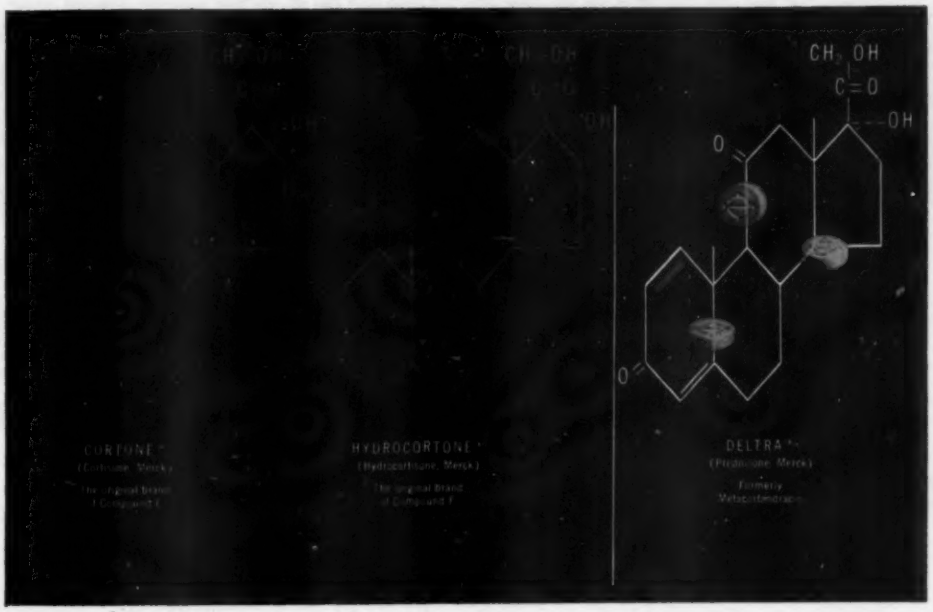

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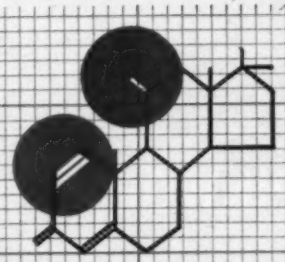

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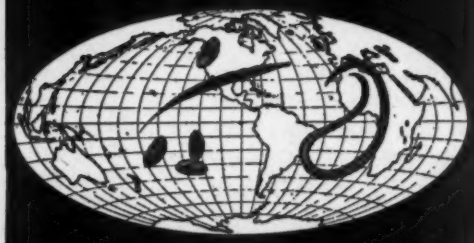

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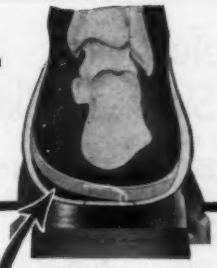

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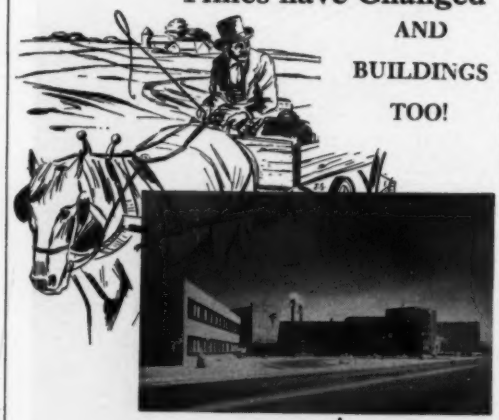

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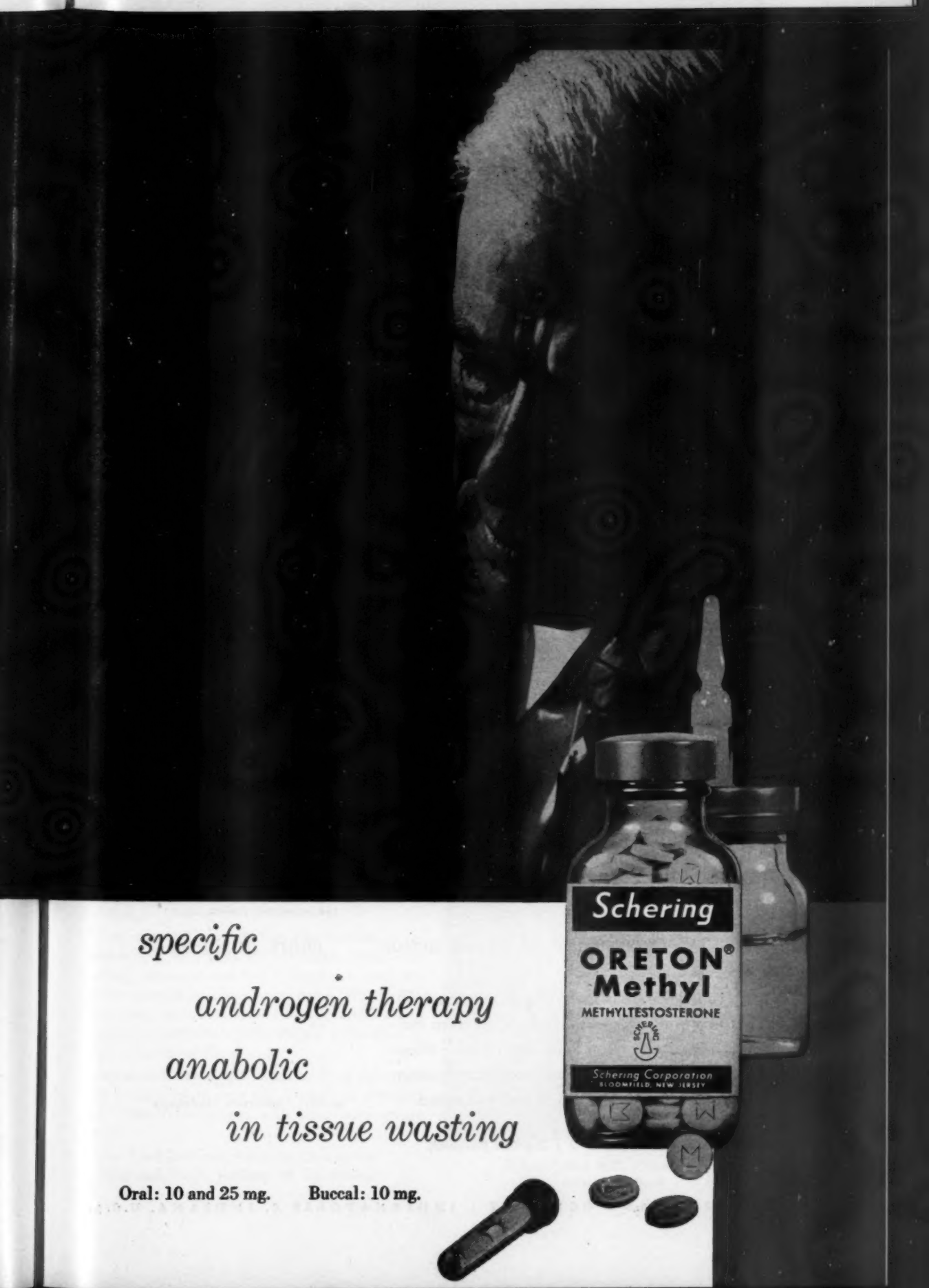

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ARIZONA MEDICINE
Journal of Arizona Medical Association

VOL. 12, NO. 8 AUGUST, 1955

Civil DEFENSE

PREFACE AND ACKNOWLEDGMENTS

THE following articles represent a manual on the medical care of mass casualties with particular reference to injuries and medical problems which may occur as a result of the weapons of modern warfare. This symposium is presented as a project of the Civil Defense Advisory Committee of the Arizona State Medical Association through the kind cooperation of ARIZONA MEDICINE and its editor Dr. R. Lee Foster. It is made possible by the generous efforts of the authors, the members of the Civil Defense Advisory Committee, civil defense authorities, and the staff of ARIZONA MEDICINE.

You will notice the format of these articles is designed to allow easy removal for filing purposes. If you have not already done so please prepare a file on mass disaster and emergency care subjects including information pertinent to civil defense in your area. This should be pursued by all physicians regardless of practice or location.

The material presented in this manual is intended only to delineate the essential facts. For further reference and for inclusion in your file please note the reading list on pages 388-389-390. Also more detailed supplementary articles will appear in ARIZONA MEDICINE from time to time. Watch for them.

Remember the ready availability of this data may enable you to save many lives. *It can happen.* Don't be caught with your information down!

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Arizona Medicine

MEDICAL ASPECTS OF NUCLEAR WEAPONS

Darwin W. Neubauer, M.D.
Tucson, Arizona

Darwin W. Neubauer, M.D.

TO CONSIDER the Medical Aspects of Special Weapons it must be remembered that our data as to the effect and patient treatment arise almost entirely from the now obsolete nominal blasts of Hiroshima and Nagasacki. The Atomic Energy Commission has improved upon these; the Russians have also.

There are three major categories of injuries sustained as the result of Atomic Warfare: (1) Blast Injuries, (2) Burns, and (3) Injuries which are the result of ionization.

1. Blast injuries are probably the most significant. They are the result of a primary blast which is a violent wind that lasts for approximately one second. There is then a secondary blast and finally the effects of falling debris. These blast injuries account for 70% of the total injuries sustained and require immediate treatment.
2. The thermal injuries result from a primary flash which injures most of the people within a radius of one-half mile of ground zero; but there are few injuries beyond two and one half miles. Combat clothes, in themselves, will protect against much of the effect of the primary flash. Secondly, there are the thermal injuries sustained from the true flame, as associated with any detonation. Thermal injuries account for 70% of the total injuries sustained and they too require prompt treatment. Again it is to be noted that these distances refer to the initial type of nominal blast bombs and are totally incorrect for the present hydrogen bombs.
3. Ionization radiation and its damaging effects accounts for 30% of the total injuries sustained. These percentages are listed with the realization that most of the patients will have a combination of injuries. Ionization effect will account for approximately 15% of the deaths, although it will influence the handling of about 30% of the patients. This group does not require immediate treatment other than caring for primary shock.

Ionizing radiation presents two types of exposure:

1. The internal exposure which results from inhaling contaminated dust or the taking in of irradiated water or food.
2. External exposure which is the usual form of radiation to be considered.

Ionizing radiation is made up of the following fundamental factors:

1. The Alpha particle which is the Helium atom and which presents no external hazard since it has a penetrating power of only 0.01 centimeter; however it presents a tremendous internal hazard for its ionizing effect is about 10,000 times as great as that of gamma rays.
2. Beta particles or electrons, will penetrate about 0.2 centimeter. They have an ionizing power approximately 100 times that of gamma rays. Consequently, they are a hazard both internally and externally.
3. Gamma rays are the major external hazard. They have no charge, but will penetrate several centimeters and make up approximately 3% of the total released nuclear energy. One half of this activity is received in the first first second, almost all of it is produced within 60 to 90 seconds after fission has taken place.
4. Neutrons also have a penetrating power of several centimeters and have about eight times the ionizing power of gamma rays. They are fundamentally hazardous for only a fraction of a second.

With an exposure from these various ionizing

factors of approximately 200 roentgens some of the people will die; with an exposure of about 400 roentgens, approximately 50% mortality is expected; and finally, for the group that receives about 600 roentgens or more there will be almost 100% mortality.

RADIATION PATHOLOGY: Tissues in themselves vary greatly in their sensitivity to irradiation. The most sensitive ones are: (1) the blood-forming organs, (2) the mucous membrane of the gastro-intestinal tract and (3) the germinal epithelium.

Clinically with whole body radiation the prime changes are:

1. Damage to the blood-forming organs which results in aplastic anemia, agranulocytosis, and thrombocytopenia.
2. Secondly, there is damage to the gastro-intestinal epithelium which in turn causes severe dysentery in association with nausea, vomiting, and hemorrhage. It is from the lower bowel with its denuded surface that endogenous infection becomes a real problem.

The symptomatology in man after exposure to irradiation is somewhat variable depending upon (1) the degree of exposure, (2) the range which varies in intensity decreasing with the square of the distance and (3) individual variations of the patient.

The signs and symptoms of the radiation syndrome can possibly be broken down into the following segments:

1. A shock reaction which usually occurs about one to two hours after exposure.
2. A latent period during which there may be no definite symptoms and which may last from four to fourteen days.
3. A phase of infection and toxicity which will vary from about six to thirty-five days.
4. Problems of hemorrhage which usually occur between the twelfth and thirty-fifth day.
5. Anemia and malnutrition which develops about the twentieth day and can persist from then on.
6. A prolonged convalescence.

The gastro-intestinal response can vary markedly. Within a few hours after exposure to ionizing radiation there may develop anorexia, nausea and vomiting. This may persist for one to forty-eight hours and then the latent period develops. The duration of this latent period is of considerable prognostic importance. The shorter the latent period, the more severe the recurrent anorexia, nausea, vomiting and diarrhea. Later there is a discharge of mucous and blood from the various body orfices, possibly with secondary hemorrhage which often results in death. There may be no latent period where there have been large doses of irradiation and death may occur before the full radiation syndrome develops.

The hematological response to intense penetrating radiation is quite uniform but exposure to low energy radiation may result in blood changes of very short duration or may even be undetectable. There is fundamentally a leukopenia with the largest drop being in the lymphocytic series. After four to six days in the sublethal case there will be increase bone marrow activity. Not so regularly seen is a reduction in the platelet count, reduction in the red blood cell count, and morphological changes in the white cells. The atypical erythrocytes and immature white blood cells begin to appear in the peripheral blood about three to ten days after exposure.

The patients fall into four categories:

1. Those patients who die within the first two weeks. They have the acute fulminating form of radiation illness. There are histological but not gross evidence of changes in the skin, gastro-intestinal tract, lymphoid tissue, bone barrow and gonads. Nausea and vomiting is noted in the first day of exposure, usually within twelve hours. It is followed by anorexia, malaise, bloody diarrhea, thrist, and fever. The fever will rise in a step-like manner and death occurs with the patient in delirum. The earlier the fever develops, the more severe the symptoms and the poorer the prognosis.
2. That group of patients who die within three to six weeks, or who may even survive the severe symptoms. These show the maximum changes in the anatomical and clinical results of radiation. The most prominent are epilation and depression of the bone marrow. The hemorrhagic and necrotizing lesions noted are comparable to those seen in aplastic anemia and agranulcoytosis. They occur in the gums, respiratory and gastro-intestinal tracts. There is nausea, vomiting and diarrhea on the day of exposure, followed by marked malaise. Then a period of improvement until about the second week when epilation marks the beginning of the relapse. They again develop fever with malaise. The fever rises in a step-

like manner. The patient will usually have pharyngeal pain followed by bloody diarrhea. There is a profound anemia, leukopenia, thrombocytopenia and purpura. General debility persists for a prolonged period. Excessive bleeding is common. Most of these patients have received about 400 roentgens. Symptomatic care will be particularly helpful in this group. They are the greatest clinical problem and the group that can be helped the most.

3. There will be a group who have mild effects or will not have early symptoms but develop their primary symptoms at three to four weeks. This group demands very little treatment.
4. There are a few individuals whose bone marrow fails to respond and they rapidly pass into a debilitated state with anemia, leukopenia and malaise. They usually die of secondary problems.

GENETIC EFFECTS: This particular aspect has received the greatest notice in the lay press and undoubtedly to date the final answer is not known. The probability of the production of a mutation by a single ionizing dose does exist; however about 600 roentgens are estimated as required to produce significant mutation changes. This is a lethal dose. Consequently, it becomes unlikely that many mutations will develop, for the survival of the patient indicates that the probable absorption has been less than 450 roentgens. Simultaneously, it must be recalled that naturally occurring and artificially produced mutations in man are 95% fatal. Of the 5% that are viable mutations, 95% are deleterious. Of these deleterious mutations, 96% are pertinent to other than sex chromosomes; therefore one would not anticipate marked genetic abnormalities from the effects of atomic warefare. They have not been noted to date in Japan.

THERAPY OF RADIATION CASUALTIES: In Japan there was no specific treatment rendered, yet there were 1000 survivors within one-half mile of ground zero. From this one can readily assume that symptomatic treatment would help considerably. To date this seems to be borne out by animal experimentation.

In work with various animals many agents when given before exposure to ionziing radiation will exert a protective influence:

1. Shielding of the spleen or of the bone marrow is of considerable help.
2. In rats, pre-exposure cysteine or glutathione has a protective influence.
3. In the mouse, diminished oxygen tension will help, as will the injection of bone marrow or spleen homogenate.
4. In some laboratory animals, large doses of alcohol has a protective influence. This level is so great that a comparable level of alcohol in the human would prove lethal itself.

There seems to be no specific treatment, but we must rely on supportive care to date:

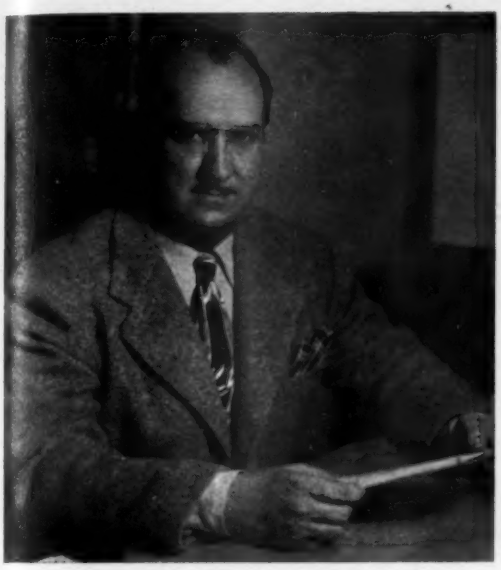
1. Antibiotics are helpful both on a prophylactic and therapeutic level. These are particularly the broad spectrum antibiotics as Aureomycin®, Terramycin®, Achromycin and Chloromycetin® and Tetracycline.
2. Whole blood to cover the period of anemia and as a replacement transfusion of approximately one-fifth of the circulating blood of the exposed individual.
3. Plasma for the handling of shock, particularly the newer preparations now on the market where the plasma has stood at room temperature for a period of six months. There is an obliteration of the danger of homologous serum jaundice by this simple measure.
4. Anti-hemorrhagic materials such as Toluidine Blue or Protomine, where there has been excessive bleeding may prove helpful.
5. Parenteral fluids to maintain the patient in balance who has severe diarrhea. This of course includes plasma expanders as PVP and Dextran®.
6. Rest, with limited activity for the exposed individual.

Inoculation seems to be contra-indicated for all the irradiated animals become extremely sensitive to the toxin of any bacteria. This would be an added reason for using a broad spectrum antibiotic not only for handling the infection secondary to large exposures to irradiation, but to replace tetanus antitoxin.

BACTERIOLOGICAL WARFARE: This is a possible and probable danger from the point of view of the Armed Forces. To date, many public health authorities do not feel that it is feasible. Research men affiliated with the Armed Forces believe they have developed a number of organisms that could be so brought to a population and give an exposure of such degree that immunization, as we know it, would not prove helpful.

CHEMICAL WARFARE

R. W. Hussong, M.D.
Phoenix, Arizona



R. W. Hussong, M.D.

CHEMICAL warfare would produce problems much different from those of either atomic or biologic warfare defense. The most likely chemical weapon – nerve gas – acts quickly, is detected with difficulty, causes death within a few minutes to an hour, and can affect large areas. Nerve gas, known also as G. gas may be dissipated within a short time, (non-persistent type), or may contaminate an area for hours to days (persistent type).

At the present time, our only protection against nerge gas is our ability to retaliate in its use. This may be enough protection, but we cannot be sure. The weapon will not demolish nor blast out whole areas, as will an A-bomb or an H-bomb, but it is effective because it works quietly and efficiently. The Army calls it G.B. It is colorless, odorless, and tasteless, and designed to destroy great numbers of people with suddeness that in many ways would make an H-bomb take second place.

Russia has one or more factories working full time on the production of nerve gas and there may be more. In 1928, Russia ratified the Geneva Protocol outlawing gas warfare but stated she would not be bound by it in any war with a non-ratifying state. The United States did not go along with this protocol because it was considered inadequate and ineffective, and, now that we know more of Russian tactics in such matters, it is more evident than ever that preparation is the best deterrent to any future war with Russia.

Val Peterson, Federal Civil Defense Administrator, stated that, "If an all-out nerve gas raid against the United States were launched tomorrow, the death toll would be in the billions and it could be deadlier than the atomic bomb."

We do know the affects of and how to protect ourselves against G-gas. We are at present way behind on the protective measures. It may be that pressure from organized medicine may help to get this protection to the population of this country. It is something to think about.

How could G-gas be used against us? Any intercontinental bomber could carry enough G-gas to kill all people with a 10-mile radius of its released bombs. The concentration of gas within the bombed area could kill every unprotected human being within four minutes. Not a very good thought.

Not much will be said in this article about the other chemical agents, such as mustard gas and phosgene, because the same protection would be needed against those gases as for G-gas.

As can be seen by the foregonig statements, the nerve gases are far more toxic than all of the previously known war gases, and are nearly colorless and odorless which makes them far more dangerous. They are liquids,, which release gas as they evaporate. After their use in a bombing raid or in an aerosol type of time bomb, they would probably stay close to the ground if weather conditions were rather stable. With the higher concentration near the ground, the death rate would be far greater.

The nerve gases are hydrolyzed slowly by water and at a more rapid rate by alkalies. The resulting hydroloysis products are less toxic than the original nerve gas.

These gases are absorbed into the body through the skin and mucous membranes, and through the gastrointestinal tract by swallowing saliva contaminated with the material. G-gas works by inhibiting a vital enzyme, cholinesterase, which destroys acetylcholine. Acetylcholine is a substance produced by nerve stimulation and, if not destroyed at a proper rate, it

overstimulates the parosympathetic nerve endings which control such vital functions as respiration and circulation, and the muscles go into convulsive spasms. Paralysis and death follow.

The symptoms produced by this gas depend upon the amount absorbed, which in turn is determined by the concentration of the nerve gas in the air and the degree of contamination of the skin or body portals. The action of the gas is prompt, and in contrast to the irritant war gases, it has no latent period.

The sensations experienced by a victim of G-gas were described by Dr. Seymore D. Silver, head of the Toxicology Division of the Army Chemical Center. "The first symptom is a feeling of weight on the chest and difficult breathing. Then the nose starts to run, the pupils of the eyes constrict and vision becomes difficult. Dizziness and sharp headache follow. The victim loses his sense of co-ordination and equilibrium. Suddenly he will fall to the ground, all his muscles twitching. Convulsions begin. Breathing becomes increasingly difficult and soon ceases. although the heart may continue to beat for another four or five minutes. As death comes, the body may be arched in paralysis, or limp in a flaccid paralysis."

After inhalation of larger doses of vapor, or absorption of the liquid gas by other routes, rapid and severe broncho-spasm begins, which prevents both inhalation and exhalation. The victim becomes confused and cyanotic. There may be nausea and vomiting, which is followed by unconsciousness. The blood pressure falls to shock level and there may be temporary or permanent cardiac arrest.

Mild cases of the poisoining by G-gas may show giddiness, tension, anxiety, insomnia, and excessive dreaming. The symptoms of depression, restlessness, tremor, emotional instability, and irrational behavior may occur after more severe exposure.

Nerve gases cause no significant gross or microscopic pathological changes except those associated with pulmonary edema or lack of oxygen. Laboratory findings are essentially normal, except that by special techniques, the cholinesterase level of the blood may be greatly reduced.

The preliminary treatment is as follows:

Any physical exercise on the part of the victim should be avoided and he should be kept at absolute rest after being rescued from the gas area. Any contaminated garments should be removed at once and left outdoors. The skin should be cleaned of adherent nerve gas or fluid by thorough washing with alkaline solutions such as a 5 to 10% solution of sodium carbonate, or amonia water (household ammonia). In case such alkaline solutions are not available, the skin should be cleaned with soap and water. It is, however, essential to avoid any rubbing of the dry skin since this enhances the absorption of the nerve gas. The patient must not be transferred to a hospital or any closed quarters until he is thoroughly decontaminated.

The toxic symptoms of nerve gas poisoning are to a large extent promptly counteracted by the administration of atropine. For this reason 2 milligrams (1/30 grain) of atropine sulfate should be given immediately either by intramuscular or intravenous injection. This dose should be repeated every five to 10 minutes until a total of three injections (6 milligrams) have been given, or the cardio-respiratory symptoms are relieved. Thereafter smaller doses could be given by mouth or by injection every few hours for several days until the patient is free of symptoms. Morphine should not be given.

In case the circulation is markedly impaired, atropine should be given intravenously. However, it is dangerous to give atropine in cases with prolonged and profound anoxia because this may result in ventricular fibrillation. In such cases the administration of atropine should be delayed until the lungs have been ventilated and the heart largely has recovered from the lack of oxygen.

If the respiration is impaired to such an extent that the patient suffers from a lack of oxygen, as indicated by blue lips or ashen color of the skin, artificial respiration is indicated. The usual manual methods, such as the Eve or Schafer methods, are ineffective since the respiratory muscles of the chest and diaphragm are paralyzed and do not expand after compression.

The Emerson method of manual artificial respiration may prove to give comparatively good results, especially since it permits a certain amount of drainage from the respiratory tract. With this method, the hips are lifted and lowered with the patient in the prone position. The raising of the hips 10 to 12 inches causes active expiration and lowering of the hips causes passive inspiration.

Artificial respiration should be maintained until spontaneous respiratory movements have returned, which may take 45 minutes or more.

Convulsions, if present, may be alleviated by the administration of sodium thiopental®, trimethadione (Tridione®), or ether anesthesia. Any excess of thiopental® or other barbiturates must be avoided because they act synergistically with the nerve gas in depressing the respiration. The intravenous administration of Tridione® in doses of 1 gram as a 20% solution every 15 minutes to a maximum of 6 grams depresses cortical activity effectively with depressing respiration.

The constriction of the pupils and the spasm of the ciliary muscles of the eye may not respond to the atropine medication. In mild cases they may be relieved by the instillation of homatropine or atropine into the conjunctival sac of the eye. In more severe cases atropine solution should be given until the pupils of the eye widen. This treatment may have to be repeated several times because constriction of the pupils and ciliary muscle spasm frequently recur.

It must be emphasized that large doses of atropine are required for severe cases and that the main danger lies in undertreatment. It is essential that atropine be given by a route which reaches the circulation rapidly. The intravenous administration is the route of choice. Intramuscular injection may be used if the patient is not cold or in shock. Absorption from the subcutaneous or oral route is too slow for initial treatment.

Certain types of gas masks protect the eyes, respiratory tract, and mouth from access by nerve gases in either vapor or spray form. The proper fitting of gas masks, and their maintenance, requires very considerable effort and training; hence, the subject of gas masks and designation of personnel who are to use them will be treated in future civil defense publications which are concerned with technical procedures.

If the nerve gas is of a persistent type, impermeable protective clothing, including boots and gloves, which prevents the absorption of the gas through the skin would be useful. Against nonpersistent nerve gases, protective clothing, boots, and gloves are not required. A certain amount of protection against the inhalation of nerve gases may be secured by breathing through a handkerchief or towel saturated with an alkaline solution, such as an aqueous solution of baking soda or soapy water.

From what is know regarding the stability of nerve gases, they may dangerously contaminate exposed foods of high water or fat content, including milk. Dry foods, such as sugar, flour, etc., are relatively little affected. Foods in airtight packages are not contaminated by nerve gas vapors, but only those in sealed glass or metal containers are safe from liquid nerve gas. Cooking of foods assists in decomposition of the gas.

In general, large bodies of water, such as reservoirs or lakes, would not be significantly contaminated by exposure to nerve gas vapors. Liquid nerve gas, however, may cause dangerous and persistent contamination of water.

It may be assumed that only persons living in large cities or strategic areas would be exposed to nerve gases. Such exposures might last for only a few minutes if nonpersistent nerve gas were encountered; the persistent nerve gas might dangerously contaminate an area for several hours to several days.

The number of persons exposed to the effects of a single nerve gas bomb would be principally determined in addition to the density of the population, by (a) the size of the bomb or carrier, (b) the prevailing winds and their velocity, which would determine the dissipation area of gas, (c) the persistency of the nerve gas used, and (d) the time of day at which the attack occurred. For these reasons it is difficult to estimate the extent or depth of the area that might be covered by the gas in sufficient concentrations to cause toxic effects. It is reasonable to assume that unprotected persons over one-half mile from the source would not be seriously affected. Adequate warning of an impending attack would greatly reduce the number of people affected. Since in a given area the intensity of the exposure would vary considerably, it appears reasonable to assume that probably not more than 50% in the area might be seriously affected.

Because atropine is the principal therapeutic agent, adequate amounts, in a readily dispensable form, such as ampins or syrettes, should be available.

In addition, medication with sodium-thiopental®, trimethadione®, or ether might become necessary. This medication would be necessary only in the treatment of convulsions resulting from severe poisoning. It is estimated that it

might be needed in approximately 10-15% of the affected cases.

For the treatment of the local eye symptoms, atropine or homatropine should be instilled into the conjunctival sac of the eye.

It must be pointed out that atropine is a violent poison, and is only used under medical supervision. It is, therefore, extremely dangerous to place this drug in the hands of a large section of the population or to allow its indiscriminate use by other means.

In view of the relatively short period of action of nonpersistent nerve gases, mass evacuation of the attacked population is not practicable. However, people should be removed from areas contaminated by persistent types of nerve gases until chemical tests prove the area to be free of contamination.

SHOCK AND HEMORRHAGE

C. Clark Leydic, Jr., M. D.
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C. Clark Leydic, M.D.

THE most emergent problem in the management of mass casualties, military or civilian, is the recognition and treatment of shock and hemorrhage. While shock is most often a result of hemorrhage, other causes may produce the same clinical entity. A convenient definition of shock of all types is: shock is an abnormal physiologic state characterized by circulatory insufficiency caused by a disparity between the circulating blood volume and the vascular capacity. This disparity may result from the loss of whole blood or from the loss of serum, as in extensive burns or increased capillary permeability due to any cause. For the purpose of this discussion, such states as neurogenic or primary, vasogenic and cardiogenic shock will not be considered.

The diagnosis of hemorrhage is usually obvious, but may be troublesome if only concealed or internal bleeding is present. The characteristic signs and symptoms of shock are pallor, cold skin, perspiration, increase in pulse rate and reduction in pulse quality, anxiety, restlessness, and hypotension with reduction in pulse pressure. Reliance on the blood pressure alone as an indication of the degree of shock is dangerous, as the homeostatic mechanisms of the body maintain blood pressure until shock is well advanced. Careful observation of the pulse rate, and correlation of the other signs and symptoms will enable treatment to be instituted before a fall in blood pressure, which is usually abrupt, indicating that the irreversible phase of shock is imminent.

For practical purposes, especially in mass casualties, laboratory examinations are not of value. Hemoglobin and hematocrit determinations may serve as a guide to treatment. Determination of blood volume by the methods in current use would be difficult to justify in such a situation.

The primary necessity in the treatment of shock is the restoration of a normal blood volume. In hemorrhage, this is done ideally by the administration of whole blood. However, when the estimated loss does not exceed 25 per cent of the total blood volume, plasma or the so-called plasma expanders will usually suffice, thus reserving whole blood for those more seriously injured.

In casualties whose primary injuries are thermal burns or radiation damage, initially plasma or the plasma expanders should be employed. Later, anemia develops in these patients; then whole blood is employed as indicated.

As in hemorrhage, most patients in shock re-

quire whole blood, sometimes in vast quantities. Since the procurement, storage and distribution of whole blood is not an easy problem, efforts have been made to provide substitutes which will permit temporization until sufficient amounts of whole blood are available, or until the body itself can compensate for the loss of erythrocytes.

The use of human plasma became wide-spread during World War II. Theoretically, it is the best substitute for whole blood. Practically, it has several disadvantages for mass use, primarily because it must be collected from humans, then processed, which is expensive and time consuming. In addition, the disturbing incidence of homologous serum jaundice from many batches of pooled plasma is a real deterrent to its use.

Plasma expanders, therefore, are receiving increasing attention because of their relatively low cost of manufacture, the ease of storage and transportation, and their effectiveness in the emergency treatment of shock. It should be reiterated that they are not substitutes for erythrocytes, which must be replaced by transfusion or the individual himself. Those in present use are macromolecular colloidal solutions that exert their effect primarily by virtue of their oncotic pressure and relative viscosity. Dextran, gelatine and polyvinylpyrrolidone are the most promising expanders at this time, although none is ideal.

Dextran, a biosynthetic polysaccharide, is available commercially in a 6 per cent solution. It is nontoxic and nonantigenic in its pure form, and produces an excellent response in mild to moderate degree of shock and hemorrhage.

Gelatin, the incomplete protein obtained from collagenous structures of animals and degraded to eliminate antigenicity, is available in 5 to 10 per cent solutions. Its effectiveness parallels that of dextran. With both, some metabolism occurs in the body. It should be borne in mind that gelatin interferes with blood typing.

Polyvinylpyrrolidone is a synthetic polymer formed from ammonia, formaldehyde and acetylene. A 3 per cent solution produces a satisfactor response. However, metabolism does not occur and urinary excretion is incomplete, hence storage in the endothelial cells and reticuloendothelial system occurs. For this reason, the drug as presently supplied has not proven popular in this country.

The ancillary measures in the treatment of shock need not be described here. One statement may be made: the vasopressor drugs, such as the sympathomimetic amines (norepinephrine, phenylephrine, methoxamine, ephedrine, etc.) have no place in the treatment of the conditions discussed. There is no reliable evidence that they contribute to the survival of such patients, and much evidence that they may hasten the appearance of the irreversible stage of shock.

Many investigations of the effects of corticotropin and the corticosteroids in traumatic shock are under way. To date, there is no indication that they are of value in the individual with a previously intact pituitary-adrenal system. As further data are compiled, however, this statement may have to be revised.

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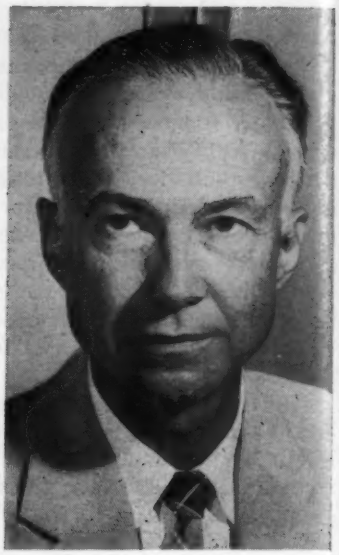

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BURNS

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CARE and Treatment of Burns as Pertains to Mass Casualties:

A. The care of the severely burned patient requires in general:

1. The prevention and treatment of shock.
2. The cleansing of the burned area and providing of protection for it; thereby preventing or minimizing infection.
3. Repair of systemic alteration in the patient's body produced by the injury.
4. Promote the early covering of the denuded area by appropriate treatment and skin grafting.

B. Extent of the body burn:

1. The extent of the body area burned is most simply evaluated by use of the "Rule-of-Nine" (Tennison and Poulaski) (a modification of Berkow's guide), employing the division of the body by 9%, as follows:

Head	9%
Upper extremities	9% (each)
Anterior trunk	18%
Posterior trunk	18%
Lower extremities (including buttocks)	9% (each)
Neck	1%

C. Degree of Burn:

1. Classification of burns as to depth:

First degree: reddening of skin.
Second degree: blistering of skin
Third degree:
(a) Superficial: destruction of the entire skin.
(b) Deep: charring of the entire skin and the underlying tissues.

The degree of depth of a burn is not immediately apparent. Reddened area, after twelve to twenty-four hours, may show blistering. Areas which show blistering, and appear to be second degree burns, may, after a period of five to fifteen days, show destruction of the entire skin area or underlying tissue.

Burns involving more than 10 to 15% of the body surface require hospitalization. The so-called "flash burn area", the face, neck and hands, often does not require hospitalization.

FIRST AID:

A. Minor Burns.

Minor burns usually require only cleasing of the part with soap and water and the application of a dry dressing. The use of ointments, antiseptics, etc., usually complicate

healing. Aspirin or Codeine is usually sufficient for the relief of pain and elevation of an injured extremity will usually prevent or reduce pain and prevent swelling

B. Severe Burns

Immediate care of the severely burned patient is to require that he lie down as fatigue tends to promote shock. Clothing should be removed from burned areas. Dirt and debris should be removed with soap and a sterile dressing, preferably a cellulose pad, should be applied and bandaged in place. (Gauze covered or backed by sterile sheet wadding is a good dressing).

A patient requiring sedation should be given 1/8 to 1/6 gr. Morphine Sulphate slowly intravenously, as absorption by other routes is unreliable in a burned patient.

Hospital Care of the Severely Burned Patient:

1. First 48 Hours (Acute Phase)

General Treatment in the Acute Phase:

Changes in the body as a result of a severe burn injury are related to the stress phenomenon, the local physical-chemical pathology and the loss of the skin as a functioning organ.

Burn shock results in almost all burns involving 20% or more of the body. Burn shock is a reduction of the circulating blood volume both as to the quality and the quantity of the blood. The blood volume is reduced because of the continuing withdrawal of the serum and plasma-like substance into the burned area, as if the body were attempting to isolate the injury or to wall it off with a protective fluid barrier. This produces dehydration of the rest of the body and increases the viscosity of the blood, eventually producing hemo-concentration. Red blood cells are directly destroyed or made more fragile as a result of thermal damage. The protein balance is thus upset as well as the Sodium-Potassium balance. Sodium is trapped in the edema fluid and high blood Potassium results from re-distribution of electrolytes and destroyed red cells.

Burn shock is rapidly progressive and reaches its maximum within four to twelve hours after injury and continues for approximately 48 hours. It is manifested by restlessness of the patient and poor color of the extremities.

Thirst is often very marked and, occasionally there is vomiting. The blood pressure is no accurate guide as to the presence or probability of burn shock. Burn shock requires immediate care, namely, the restoration of the blood volume to a working level to improve circulation. The present tendency is to administer whole blood in the prevention of shock; however, the National Research Council's recommendation of two parts plasma to each part of blood is basicly sound. The immediate administration of saline solution or glucose in water is good procedure and, except in the extremely dehydrated, the amounts should equal the total of the blood and plasma administered. Crystalloid fluids have a tendency to wash plasma out of the circulation and into the burned area and are, therefore, contraindicated; they do, however, tend to raise the blood pressure.

Orders for Supportive Therapy in Severe Burns, first 24 hours, should include:

1. Emergency sedation, if required.
2. Type and crossmatch. Draw blood for circulating blood count and hemocrit. Repeat in 12 to 24 hours.
3. Oxygen, if required, particularly in those cases where inhalation has caused damage to pharnyx and upper trachea. Prepare for tracheotomy if such is the case.
4. Intravenous plasma, normal saline solution, glucose in water, (followed by blood transfusion when available.
5. Orally, hypotonic saline-sodium bicarbonate solution, 1 tsp. salt and 1 tsp. sodium bicarbonate per quart of water orally.
6. No food by mouth, except by special order.
7. Temperature, pulse, respiration, blood pressure, every two hours, for eight hours; then, every four hours.
8. Skin test for T.A.T.
9. Administer 1500 units T.A.T. Where pa- has had tetanus toxoid, give booster dose: ½ or 1 cc., depending on preparation.
10. Insert retention catheter and record hourly volume of urine. (25 cc. per hours should be considered the minimum satisfactory output). Record intake and output.
11. Tetracycline, 250 mg. every six hours, and/or 600,000 units aqueous Penicillin every twelve hours.

2. Sub-Acute Phase (after 48 hours).

Control of pain should be continued at needed.

Forced feedings. High caloric-high Nitrogen intake, using whole milk, amino acids, defatted milk. Tube feeding of the unconscious patient. Additional vitamins should be given for the general improvement of the patient.

Local Therapy:

1. The Exposure Method:

This method consists of cleasing the burned area with soap and water and flushing with saline, placing them in clean, sterile sheets and exposing the body to room temperature. Extremities are elevated and bedding, if necessary, is cradled over the patient. Extensively burned hands are placed in the position of function and pressure dressings are applied.

This method of treatment is applicable only when one or the other side of the body is burned and removal of the coagulum requires later care by the closed method after a period of fourteen to sixteen days.

Even with the coagulum intact, this treatis not applicable after the third week in full thickness burns. More sedation is required by the exposure treatment and it is mentioned only as one of the alternate methods.

2. One-Piece Absorbent Burn Dressing of Evans and Allen.

Under aseptic precautions, remove all gross dirt with liquid detergent, soap and water or Phisohex, and flush with saline. Blebs should be removed with soft gauze moistened with saline, in the gloved hand. Brushing of burned areas to remove blebs and debris is not good practice.

Burned areas are covered with ready-made one-piece absorbent burn dressing, consisting of close-mesh gauze backed with cellulose held in place with firm gauze roll bandage. Hands should be placed in position of function, knees and elbows in extension and shoulder joints in abduction, elevating the involved extremities.

3. Pressure Dressing Technique.

Cleansing as before.

Cover the burned areas with dry sterile fine-mesh gauze, or vaseline gauze.

Apply fluff gauze, sterile waste or sheet wadding over the dressing. Cover this with elastic bandage for even firm pressure only. Dressings originally applied may be left in place for seven to fourteen days. When the entire area is dressed, it is probably best done in surgery under aseptic precautions with patient under mild anaesthesia.

A more satisfactory method is to dress the more severely burned parts every second day, changing dressings on approximately one-third of the burned area; thereby, minimizing the pain to the patient and making areas of infection apparent to the attendant. (Vaseline gauze is not removed except when infection is present, with the dressing usually being changed down to the vaseline gauze.)

4. Preparation of Burned Areas for Grafting:

In preparation of third degree burns for skin grafting, the small areas may be immediately pared and grafted in one procedure.

Infected areas are best prepared by removal of the slough, application of moist saline dressing, 1-300 aqueous, Azachloramid dressing or petralatum gauze. Whenever possible, preparation for grafts should be done between fourteen and twenty-one days after the injury.

5. Skin Grafting.

The burned area has been suitably prepared. Split thickness grafts, covering as much of the area as possible in a single procedure, should be accomplished. Deep pinch grafts are to be avoided. Homografts are mentioned only as a life-saving procedure when over 50% of the body is involved. Homo-grafts are temporary except in the case of identical twins and delay final healing as these grafts must later be replaced by patient's own skin.

To Be Avoided in the Treatment of Burns:

1. Local use of antibiotics to burned surfaces, particularly, because of their tendency to produce sensitivity.
2. Use of excessive amounts of intravenous saline or glucose solutions.
3. Application of excessive pressure to burned areas, particularly, around the joints, producing constriction.
4. Use of deep pinch grafts for covering burned areas.
5. Use of brush to cleanse burned areas. (Gentle sponging, forceps and flushing are the choice.)
6. ACTH is contraindicated because it has been associated with fulminating spread of infection.

FIRST AID FOR SIMPLE FRACTURES IN CIVIL DEFENSE*

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Note: This is a reprint of article published in the Journal of the Michigan State Medical Society, Volume 51, March, 1952, No. 3, Pages 326, 327 and 328, and full credit is given to its authors Frank H. Purcell, M.D., and George V. Hendy, M.D., Detroit, Michigan.

IT is assumed in presenting this simplified outline of first aid as related to bone and joint injuries that the first aid attendant has had at least a superficial course in first aid and has some knowledge of the treatment of wounds and the application of splints.

Skull

I. Keep patient lying down with head and shoulders slightly raised if face is of normal color or flushed. If pale, keep level or head slightly lower.

II. Move only in a horizontal position and avoid unnecessary handling.

III. Do not give stimulants or anything by mouth. Keep warm.

IV. If blood or mucus collects in throat, lower head and turn slightly to the side.

V. Control bleeding from the scalp by applying a sterile pad and direct pressure over the bleeding point. Apply head bandage.

I. If breathing ceases and pulse is still felt, institute artificial respiration.

Spine

I. Neck:
1. Do not move or lift patient's head to the back, side or forward.
2. If moved, maintain slight traction on the head in a longitudinal axis. Place sand bags or pillows on either side of the head after the patient has been placed on a rigid flat surfaced splint that extends well out beyond his head, e.g., a door. Place arms at side and then "mummify" the patient to the splint so that no motion of the spine is possible.

II. Lower Spine:
1. Transport lying on the back with a pillow under the small of the back. Use a flat surface rigid splint.
2. Never lift into or allow patient to assume a sitting position.

Pelvis

I. Transport in the lying position on a rigid splint. Tie ankles together before moving onto splint.

Lower Extremity

I. Hip and Femur:
1. Steady the limb by grasping the foot and ankle. Apply gentle traction and move the limb into a normal position so it is at the side of the body. Hold it there.
2. Apply the Thomas splint, or a long board splint from the armpit to the ankle, or tie the limbs together and use the opposite limb as a splint.

II. Knee Cap:
1. Straighten the extremity. Apply the Thomas splint or a straight board from the buttock to the heel, padding well under the knee.

III. Leg:
1. Grasp the foot or ankle and apply gentle traction. Apply the Thomas splint or a straight board from the thigh to the foot.

IV. Ankle and Foot:
1. Place a large padded dressing around the ankle or foot and apply as ascending bandage.
2. Keep patient off the extremity.

*Compiled by Robert Hastings, M.D., Tucson, Arizona.

Upper Extremity

I. Clavicle:
   1. Place arm and forearm in a sling with the elbow flexed at 90 degrees. Then with another sling bind the arm to the side.

II. Arm:
   1. Place the arm in a normal position in relation with the body with the elbow straight. Then apply a Murray-Jones splint with mild traction.

III. Elbow:
   1. If the elbow is flexed, carefully apply an arm sling and then bind the arm to the body. A sling may be used around the neck and wrist to help support the elbow.
   2. If the elbow is straight, place the arm in a normal position and apply the Murray-Jones splint without traction.

IV. Forearm and Wrist:
   1. With the patient's hand out straight, splint the forearm out straight using two long basswood splints, padding being applied over the fracture site before the splints are secured in place with roller bandage or triangular bandages.

Generally speaking, improvised splints may be used, and will have to be used whenever "formal splints or splinting material" is not available. It is an accepted rule that the first regulation in the first air of fractures is to "splint them where they lie". It is the purpose of the first aid attendant to prevent any further damage to the injured extremity at the time he first sees him or until he can be safely transported to a hospital for definitive care.

The Emergency Treatment of Fractures (Casualty Care Station)

In the treatment of various types of fractures, it is difficult to plan any standardized method that might be adequate for all types of cases. There are many fractures that present very special problems, and the proper method of treatment for such cases can only be determined after careful evaluation of these factors.

However, in dealing with a large number of casualties, one must plan some uniform care. We shall first consider simple fractures:

1. All simple fractures with no displacement should be immobilized immediately in circular plaster case.

2. All fractures of long bones with displacement, should be treated by skeletal traction.

3. Oblique fractures of long bones with displacement, may be treated with open reduction and internal fixation, if trained personnel and facilities are available.

4. Fracture-dislocations, unless trained perpersonnel is present, are best treated by skeletal traction.

5. After a period of time in skeletal traction and when healing begins to take place as shown by x-ray, then these cases should be immobilized in circular plaster casts. The pins may be incorporated in case to maintain traction if necessary. Many of these cases can be immobilized as soon as bone position is satisfactory.

Condylar fractures of lower humerus, fractures of condyles of tibia and tri-malleolar fractures of lower tibia are best treated by open reduction and internal fixation with screws if facilities and trained personnel are present.

Compound Fractures. In treatment of compound fractures, proper debridement is of the greatest importance. Skeletal traction is the safest and simplest method of mass treatment of compound fractures of long bones.

The completeness of wound excision unquestionably is one of the determining factors of the end result in treatment of such cases. The surgical clean-up and preparation of the wound begins when the patient enters the operating room. After the patient is anesthetized, the logical order of procedure is as follows:

1. Traction is maintained while the clothing is cut away or removed.

2. The wound is protected by a sterile dressing.

3. An air inflated tournequet is applied if possible to control hemorrhage if severe.

4. With the wound and fragments protected by sterile dressings, the surrounding skin of the extremity is shaved and cleansed with the soap and water and a brush for ten minutes, using sterile brushes and irrigating with warm saline or water. No antiseptic or soap is allowed to enter the wound.

5. Traction is maintained while sterile drapes are applied to the extremity.

6. The skin edges are excised approximately 0.5 cm. around the entire wound. The wound is extended longitudinally so that thorough inspection of soft tissue damage can be accomplished. All viable skin is saved.

7. The wound edges are then protected with sterile towels.

8. Warm, sterile saline irrigation of the wound is continued during the debridement in which all contused, traumatized, dead, and contaminated soft tissue is excised. Black dark areas of muscle should be excised down to fresh bleeding surfaces. All hematomats are removed, and loose, small fragments of bone which are devoid of periosteal or soft tissue attachments are excised. Large cylinders of bone should never be excised or removed. Soiled and stained bone ends are carefully rongeured. No force should be used to irrigate, rather allowing the fluid to gravitate out of the wound.

9. Nerves and tendons, which retract and are later difficult to locate, should be preserved and reunited in a simple manner after the debridement.

Primary closure may be considered after a good surgical debridement if:

(a) The soft tissue injury is not severe and antibiotic or chemotherapy has been instituted early.

(b) The time interval between the injury and surgical clean-up has not been unduly prolonged.

(c) Contamination of the wound has not been severe, and has been properly alleviated.

(d) The circulation of the extremity is not severely injured.

(e) The skin can be closed without tension.

Primary closure should never be attempted if:

(a) The wound is very extensive, dirty, and difficult to debride.

(b) Extensive soft tissue and bone damage is present.

(c) Debridement has been delayed more than eight to twelve hours.

(d) Circulation is embarrassed.

(e) Skin cannot be closed without tension.

10. When the wound cannot be closed, it should be covered by loosely packed non-adherent sterile vaseline gauze and a mild pressure dressing held in place by a plaster-of-Paris case, split from end to end. This should not be disturbed for seven to ten days unless evidence of infection intervenes.

11. If the wound is clean in seven to ten days, a split skin graft may be applied to close the wound.

12. Length and position need not be sacrificed, if the principles of traction, counter traction, and immobilization of the joint above and below the fracture, are kept in mind. Skeletal traction appropriately applied, distant to the wound, supported by a plaster cast, and swung up under an orthopedic bed with ropes and pulleys for suspension are, generally speaking, preferable to immediate internal fixation.

Antibiotics should be administered in full dosage.

The possibility of gas gangrene must be remembered at all times. Adequate debridement, with removal of all dead and devitalized tissue, especially muscle, is the best prophylaxis. Rapid pulse, fever, appearance of toxicity developing in the early period of compound fracture should raise the question of gas gangrene. The wound should be inspected if this suspicion is present. Excision of affected tissues, large doses of antibiotics, use of antitoxin are values in treatment. Get expert help for treatment of gas gangrene if possible.

Tetanus antitoxin should be given unless individual has had toxoid, in which case a "booster dose" of toxoid should be given.

Fractures of Spine. Fractures of servical spine should be treated by traction, using Crutchfield tongs or head halter for fixation. The tongs are preferable.

Fractures of dorsal and lumbar spine should be treated by hyperextension, and immobilized in hyperextension plaster jacket, unless contraindicated by spinal cord injuries or some unusual type of fracture.

Treatment of Penetrating Joint Injuries

If there is a penetrating or perforating wound of the joint, wide surgical exposure of the joint should be done as early as possible through one or more incisions with careful excision of damaged soft tissue and cartilage with the removal of all available foreign bodies. The joint cavity should be thoroughly irrigated with sterile saline. The synovial membrane and capsule should be closed by any possible means with instillation of the proper antibiotics into the closed cavity. The skin and superficial tissues should be left open widely, while the extremity is enclosed in a plaster-of-Paris splint, with a window cut out over the wound. The joint should be aspirated in twenty-four to forty-eight hours and antibiotics re-instilled. Closure of the superficial wound by suture or skin graft can often be accomplished in three to five days after the above treatment.

Emergency Amputation

Amputations among casualties are resorted to only when an extremity is irretrievably damaged or a nearly complete traumatic amputation has been performed by the wounding missile. Complete destruction of the blood supply to an extremity usually means amputation is inevitable. An open circular amputation performed at the most distal point possible is probably safest. A circular incision is planned so as to avoid needless sacrifice of skin and subcutaneous fat and these tissues allowed to retract. The deep fascia is then incised at the level to which the skin has retracted. The superfiicial muscles are divided on a level with the incised deep fascia and permitted to retract. The deep muscles are then cut through to the bone at the level to which the superficial muscles retracted. Periosteum is incised with a scalpel and the bone divided with the saw at the deep muscel retraction. Careful attention should be directed to avoid stripping or injury to the periosteum. Arteries and veins are individually ligated, transfixation ligatures being placed distal to initial simple ligatures. Skin traction is immediately applied.

ANESTHESIA AFTER DISASTER

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AFTER massive disaster, physicians unfamiliar with the specialty may be required to provide anesthesia. Even those trained in anesthesia will find they will be limited by lack of materials. It becomes necessary, therefore, to consider the safest and simplest means of providing anesthesia under the most primitive conditions.

PREMEDICATION

Prior to regional anesthesia, a barbiturate is desirable. Seconal® or Nembutal®, gr. iss to gr. iii, will sedate the patient and protect him against a local anesthetic reaction.

Prior to intravenous or inhalation anesthesia, atropine is essential. Atropine sulfate, gr. 1/100 (0.65 mgm.), in a healthy adult male of military age and gr. 1/150 (0.4 mgm.) in most other adults will provide the necessary drying effect and some protection against undesirable reflexes such as laryngospasm.

It is to be hoped that there will be stock-piles of such materials from which we can draw. If feasible, syrettes containing the above-named drugs might well be made available as was morphine during World War II.

TABLE I

MINIMAL PREMEDICATING REQUIREMENTS						
	REGIONAL			GENERAL		
	MILITARY MALE	ADULT FEMALE	CHILDREN OVER 3	MILITARY MALE	ADULT FEMALE	CHILDREN OVER 3
NEMBUTAL ® or SECONAL ®	gr. 1½ 100 mgm.	gr. 1¼ 100 mgm.	gr. ½-¾ 150 mgm.			
ATROPINE				gr. 1/100 0.6 mgm.	gr. 1/120 0.5 mgm.	gr. 1/100 to gr. 1/120 0.5-0.6 mgm.

PREMEDICATION MUST BE USED SPARINGLY IN CHILDREN UNDER 3

REGIONAL ANESTHESIA

Regional anesthesia is to be preferred where the necessary equipment is available. Reactions will manifest themselves in the form of hypotension, cyanosis, convulsions and apnea. They are treated with an intravenous vasopressor such as ephedrine sulfate, oxygen, intravenous barbiturate to control convulsions, and artificial respiration whenever apnea occurs. Mouth-to-mouth assistance of respiration will be the simplest and most readily available means. A bag and mask or other means of assisting respiration may be substituted.

INFILTRATION: Procaine, 0.5%, will provide anesthesia for ¾ hour. When ephinephrine is used, a more bloodless field will result, and anesthesia will be prolonged another hour. Suggested concentration of epinephrine is 1:100,000.

NERVE BLOCKS: An agent such as Xylocaine®, 2%, will produce excellent anesthesia. A brachial block using Xylocaine®, 2%, with epinephrine, 1:100,000, will provide effective anesthesia in excess of 2 hours. A description of the technique for this and other nerve blocks is beyond the scope of this report. But such information should be in every physician's "Disaster Folder". It is generally accepted that a limit of 1 gram should be observed. This means that one should not use over 100 cc. of 1% solution or 50 cc. of 2% solution except in robust, healthy individuals. Epinephrine is to be avoided in cardiacs and in patients with peripheral vascular disease.

SPINAL BLOCKS: This form of anesthesia is ideal for surgery of the lower abdomen and lower extremities. Procaine will anesthetize for

45-60 minutes, and pontocaine® for 60-90. Addition of epinephrine ½-1 mgm. (½ to 1 cc. of 1:1000) will increase anesthesia from 1 to several hours. It is suggested that a total dosage of 1 mgm. of pontocaine® per 10 lbs. of body weight not be exceeded. If oxygen is available, it should be used.

TABLE II

SUGGESTED DOSAGES FOR SPINAL ANESTHESIA IN 150-LB. PATIENT

Operation	Pontocaine®	10% Glucose	With Spinal Fluid	Interspace	Time
Hysterectomy	12mgm.	2cc	3½cc	L2-L3	90 min.
Herniorrhaphy, Inguinal	12mgm.	2cc	3½cc	L2-L3	90
Trans-Urethral Resection	8-10mgm.	2cc	3½cc	L3	90-120
Appendectomy	12mgm.	2cc	5 cc	L2	90
For Lower Extremities	10-14mgm.	2cc	3 cc	L2	90-120

Resulting solutions are hyperbaric — heavier than spinal fluid. Addition of Epinephrine, 0.5 to 1.0 mgm. (½ to 1cc of 1:1000) will increase anesthesia from 1 to several hours.

GENERAL ANESTHESIA

The shocked stomach does not digest food. The stomachs of patients presenting themselves for emergency surgery are presumed full until proven otherwise. Vomiting sometimes occurs when ever pentothal is used. When this happens, a bite-block should be placed between the patient's teeth and the head should be turned to one side and lowered. It may be necessary to use the fingers to dig out undigested food particles.

A clear airway must be maintained at all times. This is often accomplished by an upward pressure on the point of the chin or angle of the jaw. Where a Guedel-type oral airway is not available, a stitch through the tip of the tongue is most helpful. Loose bridge-work and plate-work should be removed. A means of removing excess mucus from the throat should be devised.

Pulse and respiration and where possible B.P. should be carefully watched for significant changes.

INTRAVENOUS: Pentothal® is not an analgesic agent. Unless an anesthetic machine is available, therefore, the use of pentothal® should be restricted to induction of anesthesia, treatment of local anesthetic reactions, and operative procedures not requiring muscular relaxation. It should be used in a 2½% solution; i.e., 1 Gm/40cc. Patients should be encouraged to cough and clear their throats of any foreign material prior to induction. The induction should be slow, in order that apnea may be avoided. If a gram has been used in a brief period of time, if the patient shows signs of requiring much more, and if the end of the surgery is not in sight, the anesthesia should be switched to ether.

INHALATION: The physician may have to devise his own mask. The equivalent of 8-12 thicknesses of gauze should be used. The face should be protected from ether "burn" by covering with a thin layer of vaseline. The eyes may be protected by a dry towel. A dry one is to be preferred, since ether evaporates more rapidly from a dry than a wet surface. Also, any wet area will then indicate the presence of ether, and can be shifted away from the eyes. The same towel can be wrapped around the mask in such a manner as to prevent the loss of ether.

Most physicians who have had experience with open drop ether know the wisdom of the saying that, "In giving ether drop by drop, never hurry, never stop." This applies to the period of induction. Later a given level can be maintained with intermittent administration of the agent.

Induction can be speeded by using vinethene, but it must be used with extreme caution since dangerously deep levels can be reached in a short period of time. Convulsive movements are frequent with vinethene. They are usually cured by removing the mask. When anesthesia is resumed it should be with ether.

When available, oxygen at the rate of 200 — 300 cc./min. should be administered under the mask. Although this will slow the induction, it will add to the safety of the procedure. Induction with ether will take from 10 to 20 minutes. Ether will be the anesthesia of choice for upper abdominal work. A satisfactory level has been reached when the eyes are fixed and respirations have become smooth and even. If there is ever doubt as to whether the patient is too deep, the ether should be discontinued. Adequate means for resuscitation will not be available. We must be prepared to do without anesthesia machines, defibrillators, and other similar aids to the surgical team. If the patient becomes apneic, mouth-to-mouth breathing for a few moments may save his life.

For those who can apply it, the endotracheal technique will prove invaluable. Even without

an anesthesia machine, this technique can be used to great advantage. Suitable catheters can be made from moderately stiff rubber tubing.

SUPPORTIVE THERAPY

After the disaster, we shall undoubtedly be forced to rely greatly on plasma volume expanders. Showing the most promise among these are gelatin, polyvinylpyrrolidone (PVP) and dextran. A description of these expanders should be among the physician's file on "Disaster Anesthesia".

SUMMARY

After the disaster, we may be without anesthetic machines, without oxygen, without equipment to provide suction. Means of supplying emergency anesthesia under these conditions is discussed.

It is recommended that the physician's folder on "Disaster Anesthesia," be augmented by a description of various nerve blocks as well as more detailed information concerning plasma volume expanders.

Adequate preparation is a small price to pay for Freedom.

THE CARE OF SOFT TISSUE WOUNDS

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Joseph M. Greer, M.D.

THE CARE of soft tissue injuries is similar in Military Combat and Civil Disaster with the exception of the actual gun shot and shrapnel wound, and the damage from radiation.

This discussion will be confined to general principles and will be given rather in outline form because of the space allotted.

The fate of the injured depends to a large extent upon the initial care which they and their wound receive. Many times it is the surgeon who first sees the patient whose skill and judgment determines the entire future course. He must examine and evaluate th condition of the patient quickly and institute the proper care, and must start immediately the care for life-threatening emergencies such as hemorrhage, suffocation, open chest wounds etc.

The physician receives the patient after first-aid, but all physicians should be well grounded in first aid, for many times the proper treatment of the patient for the first few hours or even the first few days may be just good first aid.

GENERAL PRINCIPLES

The open wound which has received proper first aid care will probably be received in the emergency room covered with a voluminous first aid compression dressing. Evaluate the condition of the patient quickly and starte life-saving treatment if required.

I. Avoid further contamination of the wounds. Wear gown, mask and dress and inspect the wounds under aseptic precautions.

II. Examine the patient and evaluate the whole situation as soon as possible. Be alert for obscure wounds and injuries. Minor wounds at first appearance may really be major injuries or become major as time goes on.

III. Determine what care takes priority. Many wounds will be multiple and some may be threatening life and will take first priority.

IV. Handle patients carefully to prevent further injury to the soft tissues, as some, and probably most, serious injuries to soft tissues, will be complicated by fractures of the spine or extremities which will cause further damage to adjacent soft tissues if not carefully and properly handled. For example patients will require proper support to facilitate breathing in chest wounds, lying on the face to prevent suffocation from bleeding in face and neck injuries. As-

pirate blood and mucous, and keep a free airway. Be alert to the necessity for tracheotomy.

V. The care of the open wound itself. Suitable anesthesia is required. Cleanse the area around the wound and then the wound itself. The interne or nurse assistant should get into this with mask, gown and gloves and use both hands, not one hand at the end of a forceps. This should be a thorough cleansing. Use plain neutral soap and plenty of water for several minutes, then flush with saline or more water for, if handling many patinets, most everything else will soon be consumed. Some surgeons like to use a mild antiseptic, which is fine if it is available.

The actual wound treatment is careful inspection, excision of devitalized tissue and repair. The needless sacrifice of viable tissue by the old debridement of excision of tissue a certain distance is not now required. Debridement should be minimum in face and hand injuries. The abundant blood supply in these areas will save much tissue that looks questionable at first. Foreign bodies should be removed as encountered but damage to tissues should not be done to remove foreign bodies, and especially if they are deep, small and metallic. The surgeon will have to make a decision as to whether to close the wound or leave it open. This will depend largely upon the age of the wound and its character. Don't forget delayed primary suture; prepare to close the wound by suture but leave it open for three or four days and then close it. War wounds were almost universally left open. Only fresh clean wounds can be closed with safety. Large contaminated wounds are not closed even though we have antibiotics. Again remember delayed primary suture. Deep repair depends upon location and tissues injured. Sutures should be placed without tension and edges approximated carefully. Modern equipment now frequently makes it possible to quickly place a split thickness skin graft over wounds in which there is great loss of skin. This makes for comfort of the patient and quick healing of the wounds, and if further surgery will be required this can be done at an earlier date. Apply compression dressings, large, thick, resilient and snug. These dressings should not be too tight and not constricting. Surgeons must verify.

WATCH THE PATIENT

Anything more than first aid treatment of wounds must not be undertaken until the patient is in condition for such treatment. Care of asphyxia, shock and hemorrhage demand first attention. The wounds should be evaluated and planning done for their care while this general treatment is being carried out.

Keep an open airway. Tracheotomy may be required. If the patient looks like he might go into shock or is in shock, institute shock treatment immediately. Don't forget oxygen and the nasal catheter is the best method to use. Morphine relieves pain and helps in shock but this should not be given or should be given with judgment in head injuries. Infusions and blood are needed. Hemorrhage must be stopped. Initially, pressure is usually sufficient to stop hemorrhage. Watch bleeding in face wounds, as pressure may be dangerous to tissues in this are and meticulous clamping of the bleeding vessels with small forceps and ligation is usually required.

After shock and hemorrhage have been treated or even during such treatment a quick and thorough physical examination is made. Surgeons should do this quickly and not damage the patient in making this examination. In the treatment of soft tissues the surgeon should know whether or not there is a fracture although it has not been definitely evaluated by x-ray, as if the fragments move they may further injure soft tissues. Watch for fractures of the spine. Is there an abdominal injury? Is there a chest injury? Decide upon operative procedure as soon as possible but do not start until the patient is ready and in condition for the procedure planned. Do not allow the patient to be moved about unnecessarily and do not allow unnecessary x-ray examinations and especially in head injuries.

Antibiotics are given soon. Preferably such antibiotics should reach both gram-positive and gram-negative organisms, such as Combiotic® initially and this to follow and added to by aureomycin®, terramycin®, etc. Tetanus boosters are given to individuals who have been in the military service or who have been previously immunized: Tetanus antitoxin to those who have not. In infected wounds sensitivity tests are recommended where feasible. Particularly if the wound starts draining this should be done. I see no point in doing this in fresh wounds. The new long acting repository penicillin compounds may prove of value in the future and will be easy to use.

THE WOUNDED ABDOMEN

First in the care of the wounded abdomen is diagnosis and evaluation. The care and handling of wounds of the abdomen has as much to do with the handling of the patient as it does with the handling of the wound with which the patient has been inflicted. The evaluation of patients in number with wounds of the abdomen is not as easy as handling a single patient with an acute abdomen, as he comes to our office or as we see him in the hospital emergency room. In the latter case if we don't know what it is that is making the abdomen acute we can look in and see.

In the injured patient with a wounded abdomen or injured abdomen there may and usually are other injuries and we would not want to add injury to his abdomen unless absolutely required. On the other hand, if it is require it must be done soon.

In the care of these injured patients with wounds and/or injuries to the abdomen I would say that we might classify the procedure as follows:

First: Recognition: Is there a wound or injury to the abdomen?

Second: Appraisal: Is this wound penetrating? Is it most likely to be penetrating? Is there likely to be injury to intraabdominal organs or hollow viscera? If the answer is "yes" make plans for laparotomy soon.

In an abdominal wound that might or might not be penetrating the question is: Is it penetrating and is there injury to the abdominal hollow viscera or solid organs? This question must be answered.

In a questionable wound of the abdomen, do not try to probe the wound to feel if it is penetrating but excise or debride the wound and see if it goes into the abdominal cavity. Locate the site of the injury as nearly as possible by the location and character of the wound and the physical findings of the abdomen. This will help in the surgery that may have to follow. In injured patients, many of our ordinary signs and symptoms of the acute abdomen are not present or cannot be depended upon. Vomiting for example, is of little value in the injured patient with multiple injuries and so soon after the mental trauma of injury. Rigidity of the abdomen is not reliable.

Remember that in the injured patient who is excited by the confusion of injury after the patient has been given a narcotic a better and more reliable examination of the abdomen can be made, with much better localization. Again watch out for head injuries and chest injuries when giving narcotics. However an abdominal injury, if neglected or overlooked, might take the patient away as surely as the head injury, if not more so. Injuries to the spine may cause abdominal pain and distention. But don't forget there may also be associated intraabdominal injury. I can recall having seen three of these in the not far distant past.

As we know, gas under the diaphragm demonstrated by x-ray is pathognomonic of injury to hollow viscera. Make this examination if it is feasible, and especially in questionable cases. However remember that the patient should be upright for at least 20 minutes before this radiograph is taken.

Normal peristalsis, as heard with the stethoscope is indicative of NO intraabdominal injury. Try to correlate the findings of the abdomen with other injuries and the condition of the patient. Keep in mind that indefinite abdominal exploration is not a harmless procedure and especially in an injured patient. Let us try to make as accurate a diagnosis and appraisal of the patient as can possibly be made and as quickly as possible. It may save lives and it will certainly save time.

All doctors know that the following symptoms may be mentioned as indicative of a ruptured viscus in an injured patient: Localizing abdominal pain, later becoming generalized, muscular rigidity, tenderness (direct and rebound) nausea and vomiting, absence of peristalsis, absence of abdominal breathing, and x-ray demonstration of gas under the diaphragm. Exploration of the abdomen by paracentesis with a large needle has been done by some surgeons. I have had little experience with this procedure.

I shall not go into the technical procedures in the operative treatment of abdominal wounds, as it varies with the condition found and to qualified surgeons it would be didactic. I will say that in most any injury of the spleen, that the spleen should be removed. Further I would like to report that many patients with wounds of the intestine were saved during the Second World War by quickly opening the abdomen and bringing the wounded and open intestine out-

side the abdomen and suturing and leaving it there and the technical repair of the intestine done at a later date.

Many more things could be said about the care and treatment of soft tissue wounds in injured people. It is hoped that these few remarks and those of other authors here will be of interest to those of you who will take the time to read them. It is further hoped that they will stimulate further thought and a study in the minds of physicians and surgeons who will be called upon to treat injured people.

THE CARE OF THE INJURED URINARY TRACT

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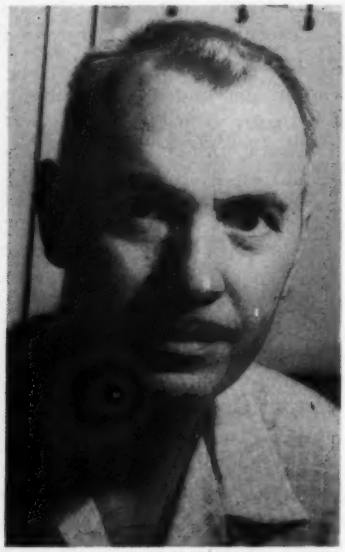

Robert Cummings, M.D.

INTRODUCTION

INJURIES of the genitourinary organs in peace time are nearly always produced by forceful, non-penetrating trauma. The kidney may be simply contused or its parenchyma and vessels may be torn or lacerated. A full bladder is occasionally ruptured by a direct blow or, even when empty, may be punctured by a spicule of fractured pelvic bone. Nor is it rare for the urethra to be disrupted at the prostatovesical or prostatomembranous junction. Usually a single injury is produced and the physician's attention is immediately directed to that injury.

In wartime, though injuries may be single, they most commonly are produced by missles and are multiple. Such wounds are nearly always complicated by perforation of intra-abdominal organs. Under such conditions the physician's attention is less commonly directed to the urinary organs.

Those experienced in the management of wartime, genitourinary wounds emphasize the importance of immediate recognition of the urinary injury so that its surgical repair may be carried out at the time of the original laporotomy. Experience has taught that early repair of urinary injuries, before infection or chronic inflammation occurs, conserves normal function of essential urinary organs.

In the following outline of the care of the genitourinary wounds, it should be assumed that coincident injuries to other organs exist but their specific management cannot be detailed.

INJURIES INVOLVING GENITOURINARY ORGANS PRIMARILY.

I. *Kidney*

A. Incidence.

Wounds of the kidney occur in from 14% to 30% of wartime casualties(3,5). Five per cent of abdominal wounds and 10% of thoracoabdominal wounds have associated renal injuries. Sixty per cent of kidney injuries have associated intraperitoneal wounds(1).

B. Recognition.

1. An evaluation of the type of injury must be made with reference to the regional anatomy. Wounds of entrance and exit must be studied and drainage of feces or urine from such wounds must be recognized.

2. Hematuria is always noted in renal injury but the degree of hematuria does not parallel the magnitude of the injury.

3. Evidence of blood loss with shock will be found in varying degree. Perirenal hemorrhage is recognized by an increasingly palpable mass in the flank.

4. Pain is located in the flank and is accompanied by muscle spasm even in the absence of intraperitoneal injury.

5. Abdominal distention and ileus follow renal injury with or without intraperitoneal perforation.

6. X-ray recognition.

a. Intravenous pyelograms should be secured in all cases of suspected renal in-

jury as soon as shock has been controlled. Only by means of this examination will the presence of a contralateral normal kidney be proven.

b. Retrograde pyelograms are advised by some urologists, but most reserve this study for those cases in which intravenous pyelography is unsatisfactory.

c. Intravenous pyelograms may fail to visualize the kidney because of profound shock, extensive renal parenchymal damage or major vascular injury.

d. Perirenal hematoma produces a concavity in the axis of the spine on the injured side and a diffuse obscuration of the psoas muscle shadow.

e. Urinary extravasation may be recognized by abnormal distribution of the contrast media beneath the renal capsule or into the perirenal fat within Gerota's fascia.

f. Foreign body or missile may be recognized in association with the evidence of renal injury.

C. Initial Care.

1. The basic principles of first aid apply to all seriously hurt persons. Strict rest and immobilization of all associated injuries must be secured to facilitate early transportation. Opiates in adequate doses must be administered.

2. Hemostasis should be attempted by packing or the application of pressure dressing.

3. Shock is treated by the administration of parenteral fluid or whole blood when available. The administration of oxygen when available is beneficial.

4. The injured patient should be conspicuously tagged indicating the nature of the wounds and the treatment given.

D. Definitive Treatment.

1. Injuries due to blast.

a. Renal contusion is usually the extent of these injuries and with conservative rest one may expect uncomplicated recovery.

2. Non-penetrating renal injuries.

a. As a rule these renal injuries are not a surgical emergency. In addition to conservative supportive measures, the maintenance of fluid and electrolyte balance, antibiotic substance should be given to prevent renal and perirenal infection.

b. Indications for operative intervention.

1. Continued and uncontrolled bleeding over a significant period of time, which is usually two or three days rather than a few hours, constitutes an indication for exploration of the kidney. Bleeding of such magnitude that immediate operation is necessary is associated with a most grave prognosis.

2. Continued bleeding is recognized in these cases by an increasingly palpable mass in the flank. Serial determination of the blood hemoglobin and hematocrit values should be followed closely.

3. Massive urinary extravasation is indicated on pyelographic studies and generally the patient's condition fails to stabilize. All evidences of renal injury worsen by the hour and the patient may appear in imminent danger of dying. Clinical judgment will indicate, even to the inexperienced, when operation is necessary under these conditions.

4. There is present the danger of infection and abscess formation when urine extravasates into a perirenal hematoma and when uncontrolled, drainage and hemostatis must be carried out.

5. When the patient is not doing well, showing progressive anemia, persistent and progressing ileus and general weakening, surgery about 72 hours after the injury may be necessary.

3. Penetrating Renal Injuries.

a. Wounds of this nature are usually associated with thoracic or abdominal injury and immediate operation is necessary as soon as the patient's condition will permit.

b. The kidney is generally approached transperitoneally during the course of the laporotomy. However, this incision may be extended laterally to approach the kidney from the classic lateral extraperitoneal area.

c. Increasing experience with the thoracoabdominal incision make it possible to explore lung, kidney and peritoneal cavity through one incision.

4. Types of Operation in Renal Trauma.

a. Debridement, exploration and removal of foreign body is necessary in penetrating wounds.

b. Hemostasis and repair in penetrating

kidney lesions is accomplished with mattress or figure of 8 sutures if parenchymal damage is not too extensive. The use of muscle tissue or hemostatic cellulose products incorporated in the closure may be helpful.

c. Nephrectomy is required when serious bleeding is encountered or when there is massive parenchymal infarction. Kidney containing multiple abscesses should likewise be removed in most cases. Secondary hemorrhage seen 10 to 14 days after repair may also necessitate nephrectomy.

II. *Ureter*

A. Incidence.

Wounds of the ureter are reported in only 3.4(5) to 6.6% of the genitourinary war wounds. The small diameter of this organ and its protected location make ureteral injury uncommon except in very extensive wounds of the flank or hip area. The magnitude of such associated wounds may preclude even first aid. And in other cases diagnostic studies to detect this injury may not be possible before emergency treatment is required.

B. Recognition.

1. An awareness of the possibility of this injury will result in a higher percentage of these lesions being located and repaired at the time of the initial surgery.

2. Hematuria in the absence of obvious renal or bladder injury suggests the possible presence of ureteral trauma.

3. Urinary extravasation from a wound may occur in several days when ureteral injury has not been recognized.

4. Chills and fever with a tender mass in the renal area suggest hydronephrosis resulting from ureteral disruption.

5. X-ray.

a. Intravenous pyelography may disclose this injury initially, or as a result of failure to disclose a normal urinary tract, make necessary retrograde studies.

C. Treatment.

1. Linear tears.

a. When the ureter is injured by a loss of a segment of its wall but with its longitudinal integrity maintained, regeneration about a splinting catheter may occur. Such a catheter of 10F or 12F size, inserted through the ureter is brought out of the incision at the proximal end through a pyelotomy. A nephrostomy should likewise be done to divert the urine from the healing ureter. A T-tube may also be used to splint the ureteral defect but positive drainage is less certain than when a nephrotomy is performed. The torn edges of the ureter are curved over the splinting catheter as much as possible with interrupted fine catgut sutures as described by David M. Davis.

b. The use of a ureteral catheter as a splint, threaded through the ureter upward into the pelvis of the kidney and downward into the bladder is condemned, for such a splint cannot be properly maintained sufficiently long to allow healing.

c. The wound must be drained at the site of injury.

d. The splinting of the ureter is maintained for six weeks.

e. Post recovery dilatation of the ureter will occasionally be required.

2. Transverse complete tear.

a. When the two severed ends of the ureter are located in a wound, they may be united over a splinting catheter by approximating the muscularis layers with interrupted fine catgut.

b. Splinting of the anastomosis and diversion of the urine as described above is essential.

3. Loss of ureteral segment.

a. When a segment of the ureter is removed by the injury, repair may not be possible and nephrectomy is required.

b. When salvage of the kidney is required, nephrostomy will preserve the kidney until later corrective surgery may be employed. If the proximal ureteral stump is long, a cutaneous ureterostomy may be provided for good drainage.

c. If the ureteral defect is in the distal portion, reimplantation of the ureter into the blader directly or into a tube fabricated from a long flap of the bladder will re-establish continuity.

III. *Bladder.*

A. Incidence.

Fifteen per cent of genitourinary war wounds were of the bladder(5). In penetrating wounds of the buttock 50% to 75% involved the bladder.(4)

B. Types of Bladder Injury.

1. Non-penetrating forces, such as may occur in blast injuries, may rupture the distended bladder.
2. Penetrating missiles perforate the pelvic viscera as well as the bladder in most cases.
3. Perforation of the bladder may be produced by bony fragments of fractured pelvic bones.

C. Recognition.
1. There is immediate suprapubic pain following rupture of the bladder.
2. Shock follows rapidly after the injury.
3. Though the desire to urinate is intense, only blood in small amounts is voided.
4. The abdomen rapidly becomes rigid following bladder rupture.
5. Catheterization reveals an empty bladder.
6. Urine may drain through the external wound.
7. X-ray.
a. The bladder is distended with contrast media to secure a cystogram. Films are taken in the posteroanterior and oblique positions and again after the bladder is emptied.
b. When the integrity of the bladder wall is disturbed, the contrast media spreads into the peritoneal cavity or into the perivesical spaces.

D. Treatment.
1. As soon as shock has been controlled immediate surgery is demanded when extravasation is demonstrated. However, in contusion of the bladder, without rupture, only conservative non-surgical treatment is required.
2. When extravasation of urine occurs the abdomen is opened and the peritoneal cavity explored. Intraperitoneal rupture of the bladder is closed from the peritoneal side and after the urine and blood are aspirated from the cavity, the peritoneum is closed without drainage. The bladder is then opened, foreign body removed when present, extraperitoneal defects closed, the perivesical area drained and the bladder closed about a 28F to 30F catheter, brought out of the wound about three fingerbreadths above the symphysis.
3. Cystostomy drainage is maintained for at least seven days.

IV. *Urethra, exclusive of the penile segment.*

A. Location of proximal urethral injuries.
1. At the vesical neck with separation of the prostate and bladder.
2. At the apex of the prostate with separation of the prostate from the membranous urethra.
3. In the proximal urethra from the membranous urethra to the penoscrotal junction.

B. Recognition.
1. Injury above the triangular ligament (urogenital diaphragm).
a. There is immediate suprapubic pain, especially when urination is attempted, and the abdomen becomes rigid.
b. Shock may occur and with continued bleeding a suprapubic mass occurs.
c. Blood and urine do not appear at the urethral meatus, for the injury is above the external urethral sphincter.
d. A catheter or sound usually will not pass into the bladder.
e. X-rays are not essential but if a urethrogram is made, the point of rupture is visualized.
f. Cystoscopy only adds to the shock and pain and is not essential.
2. Injury below the triangular ligament.
a. Pain is located in the perineum.
b. Suprapubic pain and rigidity are absent.
c. There is steady bleeding from the urethral meatus but urine cannot be voided.
d. Hemorrhage outside the urethra is contained within Colles' fascia.
e. A catheter obstructs at the site of the rupture.

C. Treatment.
1. Rupture above the triangular ligament.
a. Suprapubic cystostomy is performed.
b. Hemostasis is secured in the retropubic space.
c. An indwelling catheter, inserted through the urethra, may be guided through the defect by inserting the index finger through the prostatic urethra. Or it may be necessary to use two sounds, one through the urethra from below and one through the prostate above, in an effort to guide the lower sound into the bladder so that a catheter may be passed over its tip and passed through the urethra in a retrograde manner as the sound is withdrawn.
d. It is seldom possible to re-unite the

torn fragments with sutures. This reapproximation is best accomplished by placing traction on a Foley bag catheter distended within the bladder. Reapproximation may also be accomplished by placing heavy traction sutures in the vesical neck on either side of the urethra and then drawing them out through the perineum behind the scrotum on long straight needles as described by Leadbetter. Traction on these sutures, which may be tied over pads in the perineum, will pull the separated fragments together.

2. Rupture below the triangular ligament.

a. A perineal incision over the urethral bulb, will disclose the torn ends of the urethra which may then be reunited over a splinting Foley bag catheter.

b. The perineal wound is drained.

c. The splinting catheter is maintained in the urethra for three weeks.

d. Subsequent urethral dilatations must be regularly and unrelentingly carried out after the catheter is removed.

V. *Penile Urethra and Penis.*

A. These mutilating wounds are produced by missiles and recognition is obvious.

B. Objects of treatment.

1. Hemostasis.

2. Debridement must be skillfully done to preserve all viable tissue.

3. A urethral splinting catheter must be inserted.

4. Late reconstructive surgery will be required.

VI. *Scrotum.*

The scotum possesses great elasticity and regenerative characteristics and, after hemostasis and debridement, may be closed over the testes. If the scrotum is avulsed, the testes may be placed in subcutaneous pockets on the medial sides of the thighs.

VII. *Testes.*

The necessity to retain the testes, as long as there is any viable tissue, is obvious. The tunica albuginea is closed over any defects through which the testes herniate.

INJURIES INVOLVING THE GENITOURINARY OGRANS, SECONDARILY

I. *Neurogenic bladder.*

A. Basic concepts of treatment.

1. Following acute trauma to the spinal cord there is a period of time, lasting from a few weeks to many months, when all reflex cord action is gone. This period is known as the period of spinal shock.

2. Following the recovery from spinal shock all reflex activity below the site of cord injury, becomes hyperactive.

3. Reflex emptying of the bladder in lesions above sacral segments one, two and three, cannot occur during the period of spinal shock.

4. During this period drainage of the urine is necessary to prevent chronic over distention of the bladder.

B. Fundaments of treatment.(5)

1. Insert a Foley bag catheter in the urethra of patients unable to void after spinal cord injury.

2. Maintain catheter drainage until either spinal shock disappears with return of spinal reflex activity or until four to five weeks have passed after which time suprapubic cystostomy, placed well above the symphysis pubic, is performed.

3. During the period of catheter drainage the catheter should be changed every seven to ten days.

4. Tidal drainage may be instituted but prabably is not as important in preserving the capacity of the bladder as is the prevention of infection of the bladder.

5. Following recovery from spinal shock, the patient should be transferred to a center for the care of paraplegic patients.

C. Precautions in the care of the acute neurogenic bladder.(5)

1. Do not allow over distention to occur.

2. Do not expect manual pressure to empty the bladder.

3. Do not catheterize the patient intermittently.

4. Do not continue urethral catheter drainage in the presence of urethritis, periurethritis or acute epididymitis.

II. *Acute Renal Insufficiency.*

A. Causes.

1. Prolonged shock.

2. Incompatible blood transfusions.

3. Crushing injuries.

4. Hemolysis of blood from water infusion.

5. Sulfonamide sensitivity.

6. Complications in obstetrics.

7. Renal poisons, i.e., mercury and carbon tetrachloride.

B. Basic pathology.
1. Reversible damage to renal tubular epithelium.

C. Symptoms and early signs.
1. Surgical shock.
2. Nausea and vomiting.
3. Chill.
4. Oliquria, less than 400 c.c. of urine in 24 hours.
a. With the onset of symptoms there will be found, if sought, a progressive decrease in the volume of daily urine output. In the course of two or three days the urinary output will decrease to zero.
b. Anuria, occurring in an essentially normotensive patient who has no demonstrable upper urinary obstructive lesions, is due to renal failure.
c. The output of urine may most accurately be determined if a functioning urethral catheter is left indwelling.

D. Prognosis of acute renal failure.
1. Recovery from acute renal failure has been reported in 80% of a small series of cases.(8) Others feel that 50-75% recovery is the average at this time.(11)
2. Causes of failure in treatment.
a. Over hydration.
1. The kidney in acute renal failure cannot be driven to function by forcing excessive fluid intake by any route.
2. Excessive hydration causes pulmonary edema, cerebral edema (with mental confusion, convulsion, coma and death) and peripheral edema.
b. Electrolyte imbalance.
1. Elevated plasma potassium is toxic to the myocardium and is the most common cause of death in anuria.
2. The toxic effect of potassium on the myocardium is accentuated by low plasma calcium and sodium and by acidosis.
3. Sodium chloride and potassium loss may be excessive in the period of diuresis following regeneration of the tubules causing rapid deteriorization of an already seriously ill patient.
3. Diuresis and ultimate recovery should begin within nine to fourteen days after the onset of anuria.(8-10)

E. The physiology of electrolyte changes in anuria.
1. Normal cell catabolism produces a relatively slow increase in plasma potassium in the anuric patient over a period of many days. However, when potassium in excess is released from damaged cells, as may occur in crushing injuries, burns, infections or hemolysis of blood, there occurs a marked and rapid increase in plasma potassium with severe myocardial dysfunction.
2. Electrocardiographic changes in hyperkalemia appears early but clinical signs are not reliable and occur late as death becomes imminent.
a. Early electrocardiographic changes of rising plasma potassium are elevation and peaking of T waves in the precordial leads, and as further elevation occurs, these T wave changes occur in the limb leads. At this time as the potassium level rises there is widening of the angle between the S wave and the ST segment until it is obliterated in the limb leads. The T wave then becomes rounded and the P wave may disappear. Widening of the QRS segment in these cases indicates low plasma calcium.
3. In the anuric patient, inorganic phosphorus is retained and as the level of plasma phosphorus rises there is a fall in plasma calcium. Raising the calcium level will not however, decrease the phosphorus.
4. Calcium is a specific antagonist of potassium in its effect on the myocardium.
5. Intravenous glucose causes some reduction of phosphorus but not enough to allow the calcium to rise sufficiently to antagonize the elevated potassium.
6. Intravenous sodium decreases the potassium in the plasma by forcing potassium back into the cell.
7. Intravenous glucose, with insulin added, converted to glycogen, removes potassium and some phosphorus in this carbohydrate complex.
8. Glucose must be administered constantly, for the conversion of glycogen to glucose during a period of hypoglycemia releases potassium to the plasma once again.

F. Treatment of acute renal insufficiency.
1. Bed rest reduces cell catabolism to a minimum. Secure early normal electrocardiograph.
2. Antibiotics prevent or reduce infection

which if uncontrolled would excessively rapidly increase plasma potassium.

3. An indwelling catheter should be placed early so that the output may be accurately followed.

4. Vomitus and Wangensteen drainage must be accurately measured each 24 hours for replacement.

5. Oral feeding and drinking, even if the patient desires, are undesirable.

6. An intravenous polythene catheter should be inserted for continuous slow intravenous fluid administration.

7. The volume of daily intravenous fluid should be 500-800 c.c. (insensible daily loss) plus the volume of urine and gastric secretion recovered.

8. A solution advised by Meroney and Herndon(9) should be given at the rate of 25 c.c. per hour.

Calcium gluconate 10% .....100 c.c.
Sodium bicarbonate 7.5% ..... 50 c.c.
Dextrose 25% in water with
50 units insulin .....400 c.c.
Isotonic sodium chloride or 1/6 M sodium lactate—The volume of measured output.

G. Other methods of reducing plasma potassium.

1. Ion exchange resins(12-13) will withdraw potassium from the plasma but the sick patient may be unable to take them by mouth, and by rectum they form intractable impactions.

2. Peritoneal dialysis.

3. Artificial kidney dialysis.(7-11).

H. Management of the period of diuresis.

1. When renal function returns there is a rapid improvement if the patient is properly managed.

2. Output of urine during this stage may reach 3000-6000 c.c. in 24 hours and there is a flagrant waste of sodium and potassium.

3. The parenteral fluid replacement should be volume for volume with sodium chloride to which 1-2 cm. of potassium chloride is added.

4. When oral feeding is resumed, fluid may be taken ad lib but assurance of 4-6 gm. of sodium chloride and 1-2 gm. of additional potassium chloride is necessary for one week.

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THE TREATMENT OF ACUTE CRANIOCEREBRAL INJURIES

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THE objectives of treatment of acute craniocerbral injuries are fourfold.

1. The saving of life.
2. The prevention of infection.
3. The preservation of nervous function.
4. The restoration of anatomic structures.

FIRST AID

First Air Treatment consists of the maintenance of an adequate air-way in unconscious patients and the treatment of shock, especially if other injuries are present. Oxygen by intranasal catheter or BLB mask, caffeine in small doses, removal of wet clothing, rest, and transfusions with blood plasma or substitute are essential. Whole blood is necessary if there is excessive pain and blood loss from thoracic, abdominal, or extensive compound wounds of the extremities. Excessive manpulations for neurological examination, preparation of the head, and all other procedures not contributing to the patient's immediate welfare must be delayed until shock has been controlled. Open wounds are best treated by close clipping of hair, the application of a firm, dry, sterile dressing, and the use of penicillin intramuscularly. The patient should be transported to a hospital lying flat, on the side, or in the face-down position to promote the drainage of oral and nasal secretions. Air transportation is permissible. Travel is better tolerated at this stage than following operation; accordingly, immediate excavation to treatment centers is essential.

CLINICAL EXAMINATION

Observation of the following basic points has been found to be significant in estimating the extent of intra-cranial injury and in planning

the treatment:

I. **State of Consciousness.** The center of consciousness is believed to be in the peri-aqueductal gray matter of the brain stem. This area may be adversely affected by inadequate circulation due to (1) shock or (2) acute craniocerebral

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injury. Each patient follows a definite sequence of events in recovery or demise, and an understanding of this is helpful in estimating his progress.

(a) **Coma** – vital signs only, no response to pain, no reflex.
(b) **Stupor** – unconscious, vital signs, withdrawal response to pain, reflexes.
(c) **Restless Confusion** – resistive, disoriented, sometimes noisy.
(d) **Confusion** – quiet, cooperative, disoriented.
(e) **Automatic** – oriented, somewhat dazed, may ask same question repeatedly.
(f) **Lucid** – normal.

When the state of unconsciousness declines in spite of supportive treatment, it almost invariably means that these centers are being embarrassed by edema, petechial hemorrhages, or by compression. Neurosurgery is frequently urgent at this stage. Fifty cc. of 50% glucose is administered as an emergency measure to tide the patient over for a few hours.

II. **Respirations** are a reliable guide to the extent of injury.

(a) **Slow, deep, stertorous and irregular respirations of the** Cheyne-Stokes type indicate a **poor prognosis.**
(b) Respirations below 10-12 per minute usually mean extensive intracranial bleeding.
(c) Rapid, shallow, and labored breathing may indicate chest injury, encroachment on the air-way or may occur paroxysmally as part of the syndrome of decerebrate rigidity.

III. **Cranial nerve palsy** is common with basal skull fractures, especially the third, sixth, seventh and eighth. These patients may do well in closed head injuries, but usually do poorly in penetrating injuries which involve the base of the brain.

IV. **Eye-signs** are important.

Bilateral, dilated, fixed pupils are ominous signs. Recovery is rare indeed. A dilated pupil from the onset of the injury means immediate and direct injury to the third cranial nerve, usually due to a basal skull fracture. If the pupil dilates hours or days after the head injury, it usually signifies edema or hematoma on that side and may indicate emergency craniotomy.

V. **Paralysis, reflexes, and aphasia.** These abnormalities indicate localized cerebral injury. If they appear hours or days following the episode, they must be considered to be due to the development of an extra-dural, subdural, or intradural hematoma. Recovery may be accomplished by surgical treatment.

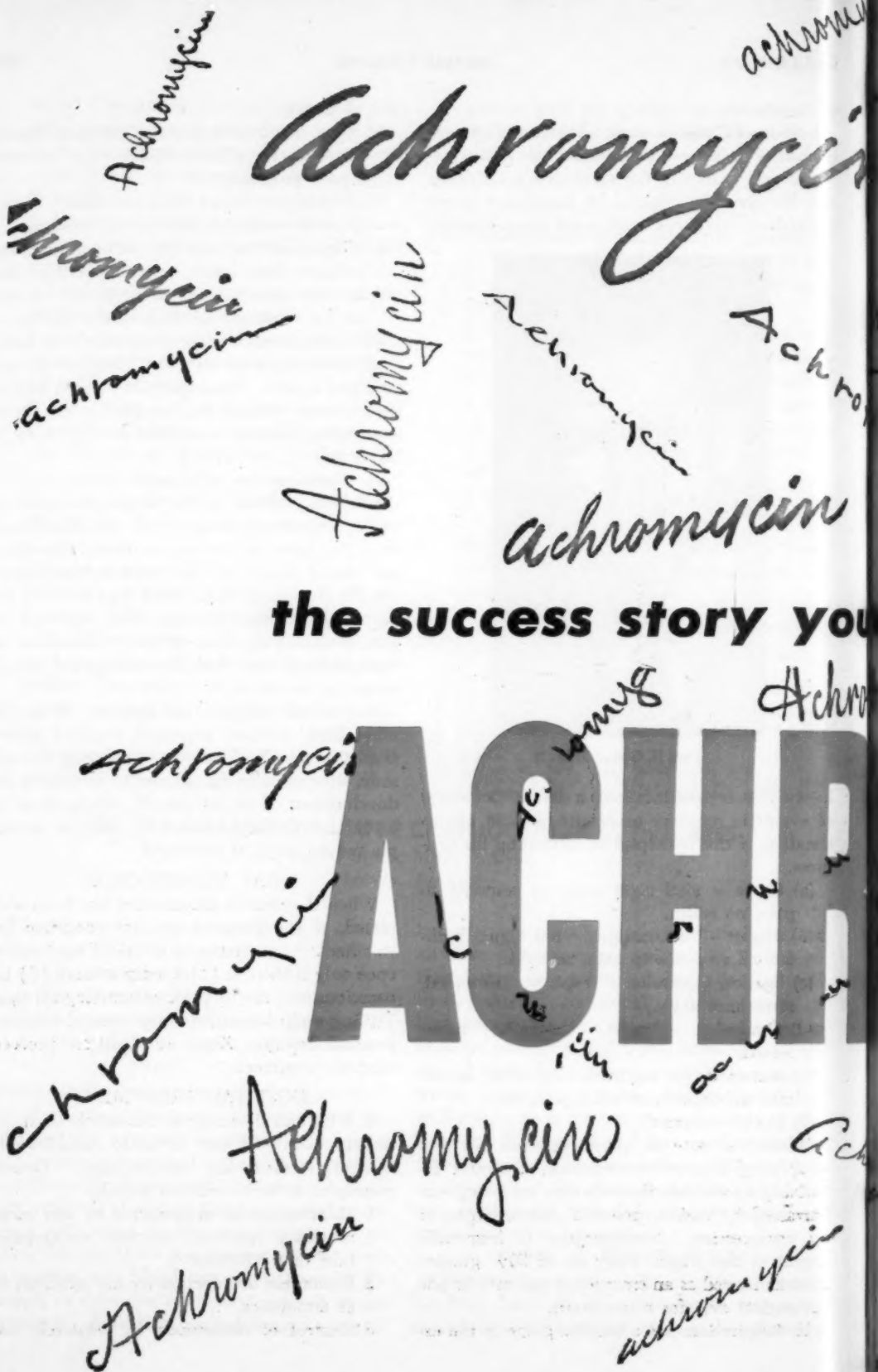
X-RAY EXAMINATION

When the clinical examination has been completed, if the patient's general condition has stabilized, x-ray studies of the skull are made at once only if there is (1) a scalp wound, (2) unconsciousness, or (3) positive neurological signs. Trifling scalp lacerations may conceal extensive cerebral injury. X-ray examination preceeds surgical treatment.

HOSPITAL TREATMENT

It is beyond the scope of this article to discuss definitive hospital care of acute craniocerebral injuries, medical and neurosurgical. General principles to be considered include:

1. **Maintenance of oxygenation** by any means necessary (postural, air-way, endotracheal tube or tracheotomy).
2. **Prevention of infection** by the judicious use of antibiotics.
3. **Control of restlessness** by relatively non-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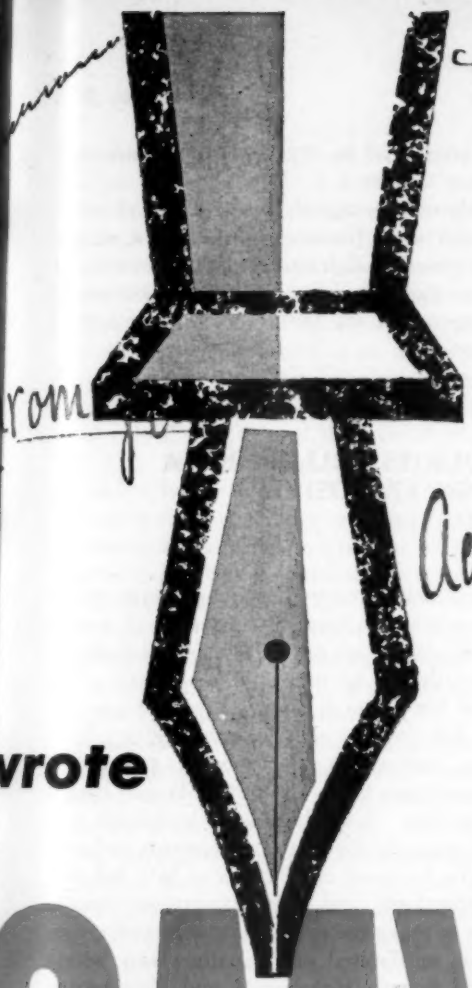

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depressing drugs (Paraldehyde, Serpasil) instead of using narcotics.

4. **Management of water metabolism,** utilizing relative dehydration for 24 hours only.
5. **Maintenance of adequate nutrition,** including feedings by Levine tube beginning on the fourth day if necessary.
6. **Control of increased intracranial pressure** by 50% glucose intravenously during the first 24 hours, and by evacuation of hematomata when indicated.
7. **Early neurosurgical debridement** of **compound skull fractures,** elevation of simple depressed skull fractures, and evacuation of extra-dural, subdural, and intra-cerebral hematomata on the basis of neurological signs.

550 W. Thomas Road

THE IMMEDIATE CARE OF EYE INJURIES FOLLOWING A MASSIVE ATTACK WITH HIGH EXPLOSIVES

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FOLLOWING a massive attack with high explosives, the majority of people who will sustain injuries to the eyes or eyelids will receive emergency treatment by physicians or surgeons other than ophthalmologists. The following information may help administer the necessary treatment until the patient can be seen by an ophthalmologist.

The type of injuries will probably fall under three headings:

I Physical Burns

II Direct trauma due to flying material, solid and chemical

III Extreme pressure either to the globe, head or chest.

A physical burn, the result of exposure to an extremely high intensity of radiant energy which is released in the form of infrared and visible light will cause flash burns (electric ophthalmia). This usually has no serious consequences. The onset of symptoms is always several hours delayed; the patient has a sandy feeling, later burning, lacrimation, photophobia and severe pain, sometimes to the extent that he can hardly open his eyes. It is advisable to search for possible foreign objects in the conjunctiva and cornea. The repeated instillations of ½% solution of Pontocaine® and cold compresses usually suffices to make the eye comfortable as the condition is self-limited and usually clears within 24 to 48 hours. Holocaine® and Epinephrine ophthalmic ointment is also soothing an occasional drop of an antibiotic solution can do no harm.

Byrnes* has shown that, "in especially clear air the nominal atomic bomb (20KT) can be expected to produce atomic chorioretinal lesions in humans' eyes up to 36 miles". There is no way to minimize the damage such chorioretinal lesions will do unless everyone has enough warning to wear dense filters similar to those required by the test organization of the Atomic Energy Commission. The filters transmit less than 0.5% of the visible light falling on them. Any retinal lesion so produced will result in permanent damage. We can just hope the macula is not damaged. The eye may develop a low-grade iritis or uveitis and dilatation of the pupil with 1% Atropine Sulphate or 1/5% Scopolamine HBr may be helpful.

The human lens is extremely sensitive to nuclear radiation and many radiation cataracts can

*Byrnes, Col. Victor A.: Chorioretinal Burns Produced by Atomic Flash, A. M. A. Arch. Ophth. 53:351, 1955.

be expected. This will not constitute an immediate problem.

Injuries as the result of direct trauma by solid material may produce lacerations of the lids. If such lacerations include the lid edge (tarsus) there will be a nasty v-shaped permanent defect unless the lid edge is approximated accurately and carefully, being certain to suture tarsus to tarsus and skin to skin and also the lid edges. Carry the sutures down the palpebral conjunctival side if this side of the wound is still not smooth. This laceration need not be sutured immediately.

Such trauma could use anything from simple contusion to actually penetration of the globe and in most extreme cases might result in loss of the contents of the globe.

Subconjunctival hemorrhages look more frightening than they actually are and require no treatment. They will gradually disappear in due times without residue.

Injuries which involve deeper structures of the eyeball, (cornea, iris, lens, retina, intra-ocular foreign objects and perforating trauma) are best referred to an ophthalmologist. Any large obvious protruding foreign object should be removed at once. For first aid all that may be required is to cover the injured eye with a sterile pad and give the patient an injection of an antibiotic and depending on the type of injury, tetanus and gas gangrene antitoxin.

Chemical injuries can be expected. Rather than wasting valuable time by attempting to find out whether the solution splashed into the eye was acid or alkali, it is wiser to proceed immediately by irrigating the eye profusely with physiological saline solution or even plain water, and continue doing so until one is reasonably certain all foreign or precipitated material has been washed out. The upper eyelid should be everted for close inspection and shreds of mucous or necrotic membrane should be carefully peeled off. Local anesthetics for pain, antibiotics, and hydrocortone will all be beneficial and if the nature of the chemical is later known, a mild neutralizing solution should be used frequently thereafter for several days. Local cold compresses, 15 minutes at a time and analgesic will help.

Pressure to the globe when severe, may cause intra-ocular hemorrhages. We could also expect a mild to severe commotio retinae and in case of severe injuries to the chest or head, we must lend an attentive ear to a patient who complains of loss or poor vision, as this may be Purtscher's retinal changes due to distant injuries. With all the above retinal changes, physical exertion should be avoided. B-complex intravenously is sometimes indicated as a supportive measure while the retina returns to normal.

PSYCHIATRIC ASPECTS OF CIVIL DEFENSE

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MAN'S USE of reason and logic in his technical problems is not equalled by his application thereof to his emotional ones. In the main, the "rational animal" is motivated by emotions. Reason, if applied at all, is usually secondary.

Thus war — a mass irrationality born of greed and fear — ever threatens. Reason is not yet strong enough a human attribute to guarantee its extinction — even when we know its new potential to be so terrible as to practically guaranttee our own.

Knowing this, the best we can do is try to apply reason secondarily — by planning adequate civil defense.

Atomic weapons have changed the tactical aspects of war in that — contrary to the past — armies no longer will shield the civil mass, but rather, the civil mass will be directly attacked. Thus, the civil population is in the front lines and only if it is able to sustain the shock will its military body be sustained by its will and productivity until it can make decisive use of its weapons.

Psychiatric problems of Civil Defense can be divided into the following categories for consideration:

I. Types of external stress to be anticipated.
II. Types of reaction that can be expected.
  (a) Individual reactions
  (b) Mass reactions
III. Prevention of
  (a) Individual psychiatric casualties
  (b) Disruptive group behavior
IV. Control of
  (a) Individual reactions
  (b) Disruptive mass reactions

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I. The causes of external stress, the use of which in war may be anticipated are: high explosive, chemical, bacterial, atomic, thermonuclear, psychological warfare, and those which are as yet unknown.

The application of the stress may be sudden and unexpected. It may vary as to timing, type, intensity, duration and frequency.

II. (a) Individual Reactions

In some there will be normal fear with controlled, rational behavior. Others – and there are few pre-existing experiences upon which to base estimates of how many – will react with anxiety, flight, fury, apathy, depression, delinquency, immaturity reactions – (with regression to infantile behavior) or passivity and even denial of the situation to a psychotic degree.

All of these may be transient or chronic. They may occur at the time of impact, in the period of recoil, or in the post-traumatic period, as full awareness of the disaster and the altered environment develops.

At the time of impact some remain 'cool and collected', the majority are stunnned and bewildered – or anxious. Some may display automatic behavior or inappropriate responses with confusion or paralyzing anxiety, uncontrolled screaming or crying.

In the recoil period – which may last several hours to a day – a return to self-consciousness and awareness takes place in the majority. Others now manifest anxiety, anger, crying, laughing or other disturbed overt behavior. There will be a need to talk out the experience to express anger, fear, despair and other feelings that result from the experience.

The post-traumatic phase will be marked by the more familiar clinical pictures: anxiety states, fatigue states, depressive reactions, recurrent traumatic dreams, rage reactions, etc. (Tyhurst, J. S., Individual Reactions to Community Disaster: Am. J. Psych. 107: 764-769, Apr., 1951.)

II. (b) Mass disruptive behavioral reactions, i.e.: 'Panic behavior' may be manifested in any or all of many patterns. Unusual emotional reactions are to be expected in the face of widespread and unprecedented destruction of property and life, disruption of community facilities, communication, police protection, transportation, sanitation and food supplies. The loss of adequate medical facilities in the presence of tremendous numbers of mutilated, dying and dead can arouse primitive disabling despair, and apathy and demoralization.

Panic, rioting, scapegoating of some degree is almost universal in serious disasters, where fragmentation of the group and loss of group identification occur due to regression to preoccupation with individual survival.

Imitative behavior and response to strong suggestion are uncritical reactions seen dramatically in mob panics. The famous Orson Welles broadcast: "The Invasion From Mars" illustrates this loss of critical discrimination between fact and fiction.

Rumors, by word of mouth, radio, newspaper or telephone – when combined with the strong suggestibility which exists in a crowd, may set off reactions of catastrophic proportions. The Detroit race riots of 1943 (Lee, Alfred M. and Humphrey, Norman D., Race Riot, Dryden Press, N.Y., 1943) were incited by rumors and resulted in the death of 34 people, the wounding of more than one thousand, wild lootings and beatings and the destruction of hundreds of thousands of dollars worth of property.

Reactions in areas remote from the attacked points will also occur. If Los Angeles were attacked, reasonable fears would be aroused in other more or less likely target areas with the production of natural – but asocial trends toward flight, concealment, hoarding and absenteeism from even vital industries.

Resentments and aggressions may become focused against the leaders or parts of the group – resulting in reactions varying from bitter criticism to riot or even revolt against constituted authority.

In panic, groups – as individuals behave in reflex, unorganized, non-constructive and illogical patterns.

III. (a) Prevention of individual psychiatric casulaties.

The level of emotional maturity and the threshhold of tolerance to stress of each individual depends largely upon the experiences of early life. Where the majority of parents are tolerant, realistic, intelligent and responsible members of a democratic society, one would have reason to expect subsequent generations to be, in the main adaptable, emotionally secure and intelligently self-disciplined.

That there is room for improvement in our culture is attested by the high percentage of psychiatric casualties in the Armed Services in World War II. Every physician can, by bearing in mind his status as a father surrogate and counsellor, do much to aid his patients in gaining mature and realistic perspectives, values and insights. A personal sense of security ensues not from the wishful pursuit of "security" – but rather from the realistic acceptance of the fact that there are no absolutes, that insecurity is inherent in the flowing processes of time and life.

III. (b) Prevention of disruptive mass reactions.

Knowledge and understanding of a situation facilitates its solution. Groundless fear of an eclipse of the sun produced panic in primitive people before the rise of astronomy. The "mysterious" flying saucer provoked a widespread obssessive interest which contained elements of panic.

Information concerning eventualitties of war should be disseminated calmly and realistically, not with urgency or drama. Crying wolf too loud or often should be replaced with clear and explicit explanation of the threat and the methods of defense against it.

Basic information regarding the effects of radiation and means of minimizing its danger should be publicized. Knowledge and realistic appraisal is more reassuring than uncertainty, doubt and ignorance of what to do, no matter how harsh the facts.

Once having informed the public about the dangers and outlined the steps for combatting them, concrete steps and constructive rehearsals should be provided. Leadership, shelter provisions, supply, transportation, communication, fire control and other facilities and functions should be planned and publicized. People should have a clear cut idea of what they should do in time of crisis – else perplexity and confusion will seize them.

An appreciation of the situation will permit normal fear to replace anxiety. A plan of action – there is always something to do to improve a situation – will provide for purposive rather than aimless behavior.

Organization will provide leadership. Confidence in leadership – from block leader to president will enable individuals to identify with those in responsible positions. Thus each feels the group responsible for him and himself responsible to the group. Defective leadership was found on many occasions to be the basis for relatively high psychiatric casualty quotients in certain military units.

Socio-economic organization with working out of improved systems of mutual aid between the rural areas (who need industrial products) and metropolitan areas (who depend on import for food, fuel, water, etc.) is being given consideration. Stock piling, auxiliary transportation, emergency communication systems and the like will be reassuring factors and thus preventative of anxiety. (GAP of APA Report No. 19, An Introduction to the Psychiatric aspects of civil defense.)

IV. (a) Control and treatment of individual casualties: Military experience would here be directly applicable.

Early interruption of severe acute reactions is the most effective approach.

Despite drawbacks, heavy sedation with barbiturates makes control possible with minimal medical supervision.

During the first three or four days first aid will be the doctors' chief duty, irrespective of specialty – but some psychiatrically supervised "exhaustion centers" should be planned and operated near other medical installations.

IV. (b) Control of disruptive mass reactions will have been largely accomplished if preventative measures have been taken. But civil defense planning should assume the possible development of panic and should include plans for its control. This, largely, is a function of central

civilian authority (police and peace officers). Medical and psychiatric contributions through adequate liason will be considerable.

When troops must evacuate in the face of enemy actions, a rout is an imminent threat.

Analogously, civilian evacuation after catastrophy must be carefully controlled and regulated to avoid disruption of transport, clogged roads, dissolution of family groups. A panicked crowd is a disorganized herd, the danger of uncritical response to apparent avenues of escape is great. But panic groups fatigue and then under strong leadership, integrating group influences can be invoked. For this reason road blocks at intervals along routes of egress are adviseable. Here the stream of people can be diverted into assembly points where accurate information as to the nature and extent of the attack can be provided. Ablebodied individuals can be organized into squads to be assigned specific rescue missions. Food, shelter and medical care can be provided.

Individuals manning such assembly points should be well selected. They should be capable of dealing reassuringly and authoritatively with the not inconsiderable hostility they may be expected to encounter in individuals or crowds.

Information should be disseminated through available radio stations, sound casting apparatus, helicopters, etc., accurately calmly and as fast as facts are clear to a pre-determined central authority. Unauthorized broadcasting should be stopped. Instructions and data should be reduced to simple, direct and factual terms, which can most easily be assimilated by the depressed, fearful, resentful victims of the disaster.

These comments represent an attempt at anticipating individual and group reactions to military stresses for which practically no precedent exists. It is therefore necessary to bear in mind that additional reactions and problems not foreseen, because no previous experience can be drawn upon, may well be encountered. The elementary mechanisms and patterns, however, of human reaction to stress remain an intrinsic part of the organism irrespective of the stress. To paraphrase: An ounce of anticipation and preparation is worth . . . .

PUBLIC HEALTH ASPECTS OF CIVIL DEFENSE

By Hugh H. Smith, M.D., M.P.H.
Tucson, Arizona

Hugh H. Smith, M.D.

PLANNING for the protection of the civil population in the event of enemy attack must be a continuing process geared to the ever increasing lethal potentialities of new weapons. Protective measures that appeared adequate only three or four years ago are now almost obsolete. Winston Churchill informed the House of Commons a short time ago that while the atomic bomb with all its terrors, was not outside the scope of human control, the hydrogen bomb had revolutionized the entire foundation of human affairs and placed mankind in a situation that was both measureless and laden with doom.

Previous planning to a considerable extent had called for measures of protection on a local basis. What is now clear is that plans for the mutual aid of one community to another must take precedence.

Regarding public health one must take a broad view. Physicians and surgeons in their practice are concerned with the health requirements of individuals, while the public health worker deals with the medical problems of humanity in groups such as households or communities. In Civil Defense public health im-

pinges on all aspects of the program, especially such vital matters as the care of evacuated populations, organization of defense against biological or chemical warfare, the interplay of emergency medical and health services, preservation of public morale, combating epidemic disease, and in the organization of teams and the training of personnel to carry out all of these protective services. There should be no conflict of defining the responsibilities of medical men and health workers. In the event of an H-bomb attack there will be all too few professionally trained individuals. Physicians and surgeons skilled in the care of the sick and injured will have to man first aid stations and hospitals to strive to save life, diminish suffering and prevent disability. Stated in outline form, the principal responsibilities of public health agencies in Civil Defense are:

I. To minimize the effects of an enemy attack upon the civilian population.

a. By formulation of plans and agreement on plans with health agencies in contiguous areas.

b. By recruitment and training of auxiliary personnel.

c. By procurement and stockpiling of necessary supplies and equipment.

d. By education of public in taking emergency protective measures.

II. To deal with the immediate emergency conditions following an attack.

a. By organization of flow of casualties to first aid posts and hospitals.

b. By striving to protect survivors from additional exposure to radioactive materials and to detect those already affected.

c. By combating panic and other mass emotional reactions.

d. By detection and recognition of radiological, chemical or biological hazards.

e. By initiating records of vital statistical data, e.g., living casualties, deaths and births.

III. To guard the health of displaced populations and to assist in the restoration of vital utilities and facilities in the devastated areas.

a. By maintenance of sanitation in emergency housing areas.

b. By preventing spread of communicable disease.

c. By supervising sanitation of food, water and milk supplies.

d. By detection of delayed radiation sickness.

e. By maintenance of records of vital statistics.

f. By assisting to restore the habitability of the devastated area.

The most important factor in the success of a Civil Defense program is gaining the confidence of the public. This can only be done by a convincing demonstration that intelligent plans have been made and that all necessary steps have been taken for the smooth implementation of these measures in the event of an attack. Perhaps it is in the formulation of these plans that public health can make its greatest contribution. Health officers are accustomed to thinking in community wide terms. What is now required is the imagination to prepare for disaster situations of an unprecedented scale and possibly of a mysterious origin.

In terms of any realistic preparation for H-bomb warfare, it must be assumed that local, state or even the national government may be completely disorganized for a period of a few days. As put by the London Economist, "this leaves the country vertebrate and smashable, whereas it must have the survival ability of a worm cut in sections". From this concept it will readily be seen that planning of a completely different order must now be contemplated. In this undertaking public health has much to offer and a heavy responsibility that must be assumed.

The following columns that appear regularly in Arizona Medicine are omitted due to this special Civil Defense issue:

ON VACATION THIS MONTH

PHOENIX CLINICAL CLUB

RX., DX., AND DRS.

ARIZONA PHARMACEUTICAL PAGE

NOTES FROM THE EDITORS' PEN

CHEST TRAUMA

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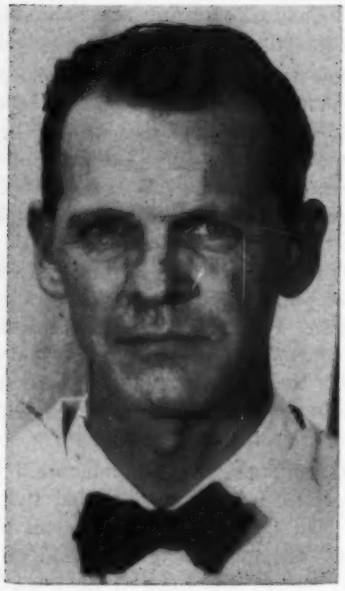


C. Thomas Read, M.D.

Introduction

THE thorax represents a large exposed portion of the body and unfortunately is particularly vulnerable to trauma. All the vital structures lying within the chest are subject to injury. Trauma of the thorax may produce a variety of injuries involving not only the soft tissues and bony cage, but also the lungs, tracheobronchial tree, heart and pericardium, great vessels, esophagus, diaphragm and thoracic duct. The possibility of visceral injury in all cases of thoracic trauma must be considered. Fractures of the thoracic cage may be easy to recognize but injury to the vital organs within may be more occult or may be so severe as to be rapidly fatal.

Some understanding of the mechanics of respiration and of cardiorespiratory physiology is essential for success in the management of thoracic injuries. At the outset of this discussion a few general remarks in this regard will be made. Further details shall be included in the description and discussion of specific injuries. In general all technics and modes of management are those applicable to the operated thorax since elective thoracotomy creates a large open wound of the chest which is treated by closure followed by certain principles in the postoperative care. This method is followed in the management of open injuries to the chest, i.e., they are changed to essentially closed wounds.

Surgical Physiology

Normally a negative tension exists within the plural spaces surrounding the lungs. This tension is dependent upon an intact thoracic cage. Defects in the bony cage or pleural surfaces change the negative tension to one near or at atmospheric pressure thus interferring with the normal respiratory movements of the lung.

Abnormal changes in pressures within the pleural cavity may come about by air entering from without as in open injuries to the chest wall, or from within due to defects in the lung surface and any combination of these. Rupture of the esophagus, or hollow viscus that abnormally may communicate with one of the pleural spaces produce similar findings.

When air escapes from the lung and there is no outside communication, a closed pneumothorax exists. This may be under tension or in combination with fluid (hydropneumothorax). There follows a collapse of the lung due to the mechanical displacement by air and/or fluid which adversely affects respiration.

Embarrassment to respiration also occurs when a flail chest (multiple fractured ribs) exists. Under such circumstances, on inspiration, there is an invagination or falling in of the injured segment and on expiration the part protrudes or bulges outward. A portion of the tidal air moves from one lung to the other with each respiration and in addition there is created a pendulum motion of the mediastinum (see below).

Defects in the chest wall and pleurae occurring with open wounds of the chest permit air from the outside to rush into the pleural cavity and the affected lung collapses. As the intact chest wall on the opposite side expands on inspiration, the mediastinum is pulled over to the same side, thus the uninjured lung fails to completely expand. On expiration the air passes through the rent in the chest wall and the mediastinum swings in that direction. This to and

fro motion is called mediastinal flutter or pendulum motion. This phenomenon results in useless interexchange of deoxygenated air between the lungs, alterations in circulatory dynamics and partial pinching of the great vessels. If these abnormalities are severe or go unattended they may rapidly prove fatal.

Treatment

Immediate Treatment.

All patients with serious chest injuries should have definitive care as quickly as possible. When necessary, the patient should be transported in semierect position with the injured side dependent. The restoration of cardiorespiratory function is imperative and treatment in that direction instituted promptly.

All open or sucking wounds must be closed by tamponing with surgical dressings preferably or any materials such as pillows, sheets or dressings of any sort in an emergency. If air tight closure is accomplished egress of escaping air from the injured lung should be afforded with waterseal and tube drainage (See Fig. II).

Tension pneumothorax or hemo pneumothorax must be promptly diagnosed and treated by needle or tube drainage. Rapidly accumulating tissue emphysema should be given an escape vent.

Patent airway is a primary immediate goal. This may best be accomplished by tracheotomy performed on the spot.

Careful evaluation and first aid given to concommitant injuries elsewhere.

Recognition of cardiac tamponade and aspiration until further therapy can be administered if indicated.

Additional Treatment.

1. Shock and control of hemorrhage. Shock may be manifest early or it appears sometime later. Intravenous therapy should be under good control for these patients tolerate poorly excess intravenous fluids especially saline. Whole blood should be used when available otherwise any other suitable agent to control blood volume is the next choice such as plasma or dextran. Control of hemorrhage should be immediate according to standard surgical principles. It should be remembered that intrathoracic and thoracoabdominal bleeding may be of such magnitude that operative intervention may be necessary before the shock state can be overcome.

2. Pain. The relief of pain helps minimize shock, promotes better respiration, enhances ability to cough and relieve apprehension. Demerol is well tolerated and is the drug of choice given in frequent doses 50-100 mgs. q. 2 h. Barbiturates helps, and the use of Thorazine may reduce the amount of narcotic used. Intercostal and paravertebral nerve blocks with procaine may be of great benefit.

3. Antibiotics should be given prophylactically to prevent infections.

4. Intestinal distention and a dilated stomach are frequently present with severe chest injuries and when eliminated by proper management will add to the patient's ventilatory capacity as well as general comfort.

5. General hygienic measures such as oral hygiene may help prevent infection and promote early recovery. Administration of TAT or toxoid as indicated should be done without fail.

6. Debridement of wounds of the chest should be accomplished as soon as possible. If the wound is large and of the open or "sucking" variety, endotracheal intubation is usually neessary.

7. Open thoracotomy is seldom necessary in chest wounds, in fact if it is performed unnecessarily the morbidity and mortality figures rise very rapidly. During World War II less than 25% of wounds required exploration.

8. Certain conditions demand open thoracotomy, namely:

(a) The thoracoabdominal wounds.

(b) The presence of large foreign bodies intrapleurally or within the lung, heart and mediastinum.

(c) Tear or fracture of a large segment of the tracheobronchial tree not controlled by simple waterseal drainage.

(d) Uncontrolled hemorrhage especially of undetermined origin.

(e) Cardiac tamponade.

(f) For chyleothorax not responding to simple therapy.

9. Evacuation of air and fluid from the chest with the goal of rapid and complete reexpansion of the lung, best accomplished by waterseal drainage and mechanical suction when indicated and if available.

Special Treatment.

Chest injuries are classified for convenience as follows:

I. Nonpenetrating (not entering pleural space)

A. Soft tissue (requires no special mention – treated as elsewhere).
B. Skeletal
C. Visceral
1. Lung and pleura
2. Cardiac
3. Mediastinal
4. Diaphragmatic
5. Traumatic asphyxia
6. Blast injury

II. Penetrating (entering pleural space).
A. Lacerations of soft parts
B. Skeletal – compound fractures
C. Visceral
1. Lung and pleura
2. Cardiac
3. Mediastinal
4. Diaphragmatic

III. Thoracoabdominal injuries

There is considerable overlapping of specific therapy for nonpenetrating and penetrating wounds of the chest since wounds of the various structures within the thorax are similar whether produced by open or closed mechanisms. The actual methods of management differ but little as far as basic principles are concerned and therefore can be discussed together. However, they may vary in degree, usually the open wounds are more severe.

Among the more common serious injuries of the thorax in civilian life are those involving the chest cage or bony framework surrounding the vital structures. The more serious of these are frequently referred to as "crushed chest", "flail chest", and "stove-in chest". These are characterized by multiple, frequently comminuted rib fractures, unilateral and/or bilateral, and parodoxical motion of the injured areas with associated mediastinal flutter. In about 75 per cent there is trauma to the underlying lung with accompanying pneumothorax or hemothorax.

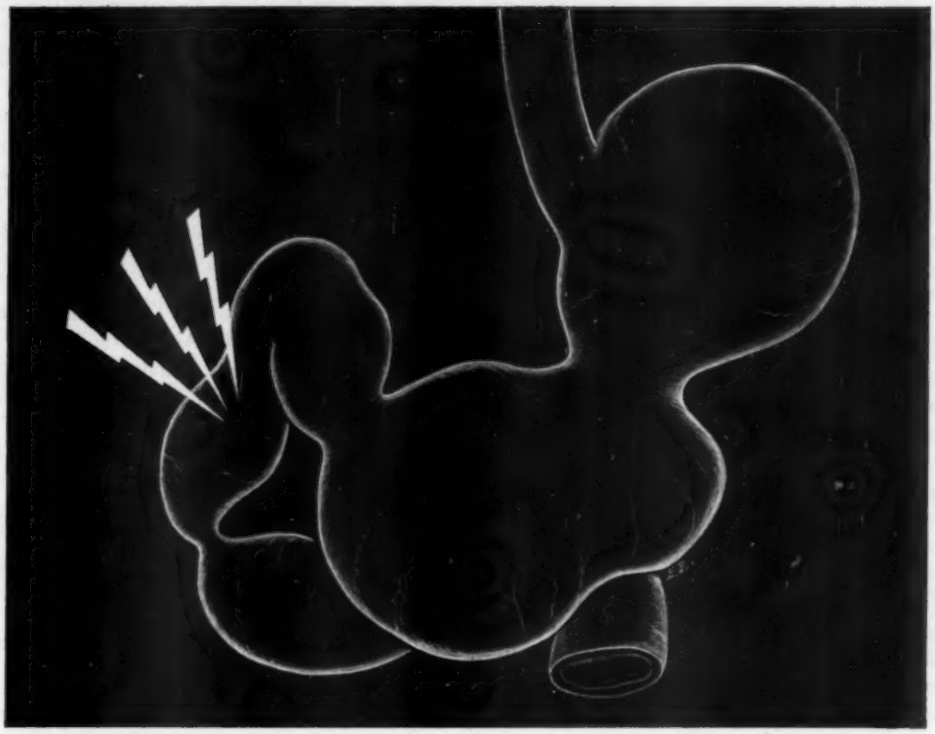
Emphasis is directed to a few simple therapeutic procedures which may contribute to the successful management of patients who have sustained severe crush injuries of the chest. It would appear that the measures taken towards therapy should remain as simple, concise and brief as possible since the patients in question are frequently moribund from shock due to concomitant injuries, blood loss and disturbances in cardiorespiratory physiology. Uncomplicated technics applied to the chest problems also permit simultaneous and more prompt attention to be directed to concomitant injuries to other areas.

Crush injuries seldom demand major surgical intervention unless there is convincing evidence of concomitant laceration or rupture of significant branch of the tracheobronchial tree, severe bleeding of undetermined origin, protracted cardiac tamponade, rupture of the thoracic duct, or traumatic laceration of the esophagus. There has been some suggestion of extensive surgery in these critically injured patients in the form of wiring or pegging, the fractured ribs to accomplish immobilization. It is doubtful that procedures of such magnitude are necessary when it has been show that less drastic measures will accomplish the desired results. No procedure should be performed that does not actually serve to preserve the patient's life and hasten his recovery and certainly not one that would jeapardize it. Definitive surgery, generally speaking, should be withheld until the patient's vital functions are well stabilized.

Many measures of management of chest injuries are offered which prove to be deficient to some degree as evidenced by the number, variety, and modes of therapy recommended. These include strapping and fixation of the mobile segments of the thoracic cage by using steel wire or tenacula. Open pinning of the ribs has been recommended but requires extensive procedures. The use of the Drinker respirator has very limited but specialized use.

No standardized method of treatment accomplishing elimination of parodoxical motion of the chest wall can be offered. This is readily understood when it is realized that a variety of physiopathological events occur in serious injuries of the chest. One or several complications such as hemothorax, pneumothorax, tension pneumothorax, paradoxical motion of the chest wall, mediastinal emphysema and "wet lung" may predominate in any particular case. However, immediate attention to certain basic principles of therapy in their regard will help simplify the most complex combination of findings. The principles of therapy are to combat shock and control hemorrhage, eliminate paradoxical motion, maintain a patent airway, promote early and prompt reexpansion of the lung, control pain, relieve dilatation of the stomach and abdominal distention and prevent the appearance of infection with the prophylactic ad-

PRO-BANTHINE FOR ANTICHOLINERGIC ACTION



Abnormal Motility as the Cause of Ulcer Pain

Until recently the general opinion was held that ulcer pain was primarily caused by the presence of hydrochloric acid on the surface of the ulcer.

Present investigations[1,2] on the relationship of acidity and muscular activity to ulcer pain have led to the following concept of its etiologic factor:

"... abnormal motility[2] is the fundamental mechanism through which ulcer pain is produced. For the production and perception of ulcer pain there must be, one, a stimulus, HCl or others less well understood; two, an intact motor nerve supply to the stomach and duodenum; three, altered gastro-duodenal motility; and four, an intact sensory pathway to the cerebral cortex."

Pro-Banthine® has been demonstrated consistently to reduce hypermotility of the stomach and intestinal tract and in most instances also to reduce gastric acidity. Dramatic remissions[1] in peptic ulcer have followed Pro-Banthine therapy. These remissions (or possible cures) were established not only on the basis of the disappearance of pain and increased subjective well-being but also on roentgenologic evidence.

Pro-Banthine Bromide (Beta-diisopropylaminoethyl xanthene-9-carboxylate methobromide, brand of propantheline bromide) has other fields of usefulness, particularly in those in which vagotonia or parasympathotonia is present. These conditions include hypermotility of the large and small bowel, certain forms of pylorospasm, pancreatitis and ureteral and bladder spasm.

1. Schwartz, I. R.; Lehman, E.; Ostrove, R., and Seibel, J. M.: A Clinical Evaluation of a New Anticholinergic Drug, Pro-Banthine, Gastroenterology *25*:416 (Nov.) 1953.

2. Ruffin, J. M.; Baylin, G. J.; Legerton, C. W., Jr., and Texter, E. C., Jr.: Mechanism of Pain in Peptic Ulcer, Gastroenterology *23*:252 (Feb.) 1953.

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ministration of antimicrobial agents. Good judgment dictates that after a quick but thorough evaluation of the patient attention will be directed to the most pressing problems at hand in order of importance in attending the individual.

Patients with chest injuries under discussion present a more or less uniform clinical picture. There is usually some degree of shock as well as cyanosis associated with a rapid, sometimes feeble pulse. Respirations are shallow, grunty, rapid and in the conscious patient are accompanied by marked pain and apprehension. On palpating the chest bony crepitus is easily elicited and in these areas paradoxical motion is apparent. The tracheobronchial components contain thickened tenacious secretions which are often bloodstained with associated injury of the pulmonary parenchyma and bronchial system. When the secretions reach such a volume as to plug the bronchial divisions atelectasis results. The impacted secretions, atelectasis and injured lung are recognized as the "wet lung" syndrome. Because coughing is painful and ineffective atelectasis is unrelieved and a greater respiratory effort is demanded. This results in more marked paradoxical motion of the chest wall. Tidal exchange is further embarrassed since a portion of the deoxygenated dead space gasses in the involved areas are shunted into the uninvolved zones. Thus a vicious cycle is established; the greater the ventilatory demand the more marked is the paradoxical motion with the increased respiratory effort.

The use of an endotracheal tube, aspiration by tracheal suction, bronchoscopy, and tracheotomy are readily available methods in establishing and maintaining a clear airway.

Transnasal catheter suction requires a minimum of equipment and should be accomplished without delay to relieve a hazardous situation when excessive tracheobronchial secretions are in evidence. Every interne and resident should become proficient in carrying out this mode of treatment for it is not only applicable in chest trauma cases, but useful in all types of postoperative surgical patients. Although this method is efficient initially, it requires frequent repetition producing trauma to the nares and at times exhausts the patient when with repeated efforts the catheter does not readily enter the glottic chink. Also, it is sometimes questionable whether or not the catheter can be directed to sufficient length into the bronchus and into the desired side. A suggestion in regard to the latter is to turn the head decisively to one side and then the other as this maneuver directs the catheter into the bronchus opposite the side to which the head is turned.

An endotracheal tube can be passed through the nares or directly through the mouth with the aid of a laryngoscope. This offers an efficient method of cleansing the tracheal bronchial tree but for apparent reasons it is not tolerated for any extended period. However, it might serve until other equipment is forthcoming.

By bronchoscopy aspiration can be performed efficiently and under direct vision but all are not trained in endoscopy and more elaborate equipment is needed. Aspiration by this method likewise requires repetition. Its greatest objection lies in the manipulation required of the patient which is poorly tolerated. Any strain or effort on the patient's part increases the parodoxical motion and if there is added excitement and struggling as well as poor relaxation a chain of events may be set off that might terminate fatally. Crushed chest patients have low reserves and any unnecessary expenditure of effort on their part might be sufficient to push them beyond their limits of physical tolerance.

Both tracheal suction and bronchoscopy require manipulation and movement of the patient which may be detrimental to concomitant injuries to the head, spinal column, and exteremities.

Tracheotomy combines all the gains, purposes and benefits of the aforementioned methods of aspiration and permits the nursing staff to assist in constantly maintaining a clear airway. It can be accomplished quickly, on the spot with very little manipulation and disturbance to the patient.

Tracheotomy not only permits maintenance of a patent airway through frequent, easy suctioning but with it paradoxical movements of the mobile segments of the chest wall are noticeably decreased. Pain is likewise relieved through diminished movements of the loose thoracic cage and by lessened respiratory efforts resulting from decreased resistance to inspiration and expiration. Greater effective tidal ventilation also is brought about by a reduction in the physiological dead space.

Treatment of patients under discussion de-

mands immediate evaluation of all the problems presented. An x-ray of the chest is mandatory for although the diagnosis may appear obvious on physical examination, it may be misleading and a portable x-ray view may be a lifesaving measure. This can be obtained without interrupting treatment.

Tracheotomy is performed either in the emergency station or at the bedside on the least provocation. A good rule concerning tracheotomy is, if it is considered a means of therapy, it should be done then and not delayed by a period of fruitless procrastination.

Following tracheotomy or lesser procedures as indicated the hemithoraces are then looked after. Usually one side has received more trauma than the other, but in any event if by x-ray examination one or both present evidence of hemothorax, pneumothorax, or a combination of these complications, immediate closed thoracotomy is performed. This again is done at the location of introduction to the injured patient. Preferably a trocar and cannula are used but they are not absolutely necessary. It is important to use a catheter of size 20 to 22 French with two holes in its tip. If a trocar is not available a stab wound in the skin followed by blunt dissection with a hemostate will suffice. (Fig. 1).

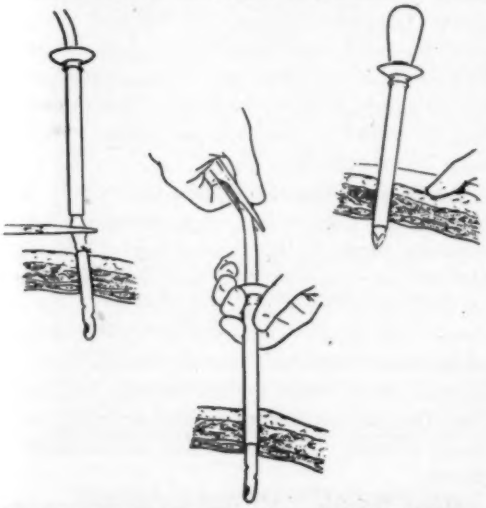

Figure 1. The uppermost view depicts the trocar and cannula introduced through a short superficial incision in a convenient interspace. The middle view shows the trocar withdrawn and a catheter being introduced through the cannula. The lower view shows the catheter in situ and the cannula being withdrawn over the catheter.

After gaining entrance into the pleural space by this method, the catheter over the end of the hemostat is then thrust through the incision into the space. The catheter is connected immediately to a water seal drainage bottle (Fig. 2). The anterior second interspace or a convenient interspace in the axillary region lend themselves readily to this procedure.

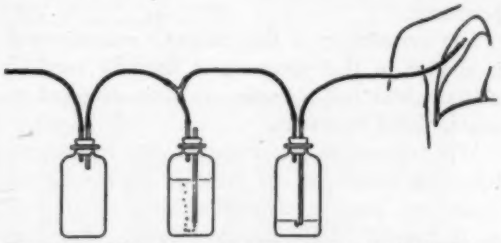

Figure 2. This drawing illustrates a typical water-seal drainage with suction applied to the water-seal bottle. It is to be noted that the bottle nearest the patient contains a tube beneath the water level which is connected with a tube emerging from the drained chest. This one bottle may suffice in many instances for simple drainage; however, if suction is needed, the middle bottle is added. The other bottle is a simple trap bottle to avoid water getting into the suction line. The middle bottle is inserted as a means of controlling the suction. It is to be noted that a long glass tube extends below the surface of the water some distance and the other end is open to the atmosphere. When suction is applied to this bottle through the illustrated connections its tension is determined by the distance the tube is placed under the water. For example, if the tube extends below the water level 20 cms., and suction reaches this particular tension then air enters to break the suction at any tension above this level. By this means a regulated, consistent suction can be applied merely by regulating the distance the tube is inserted beneath the surface of the water; usually 8-20 cm. water tension is sufficient.

When a hemothroax exists and the proximity of the lung is in question, a tracheotomy tube with its blunt stylet fitted into place, to avoid injury to the lung, can be inserted through a stab wound. Another advantage of this maneuver is that the tube can be directed to any region by pointing the tracheotomy tube in the desired direction within the pleural space.

Pain is usually controlled by frequent doses of Demerol (if necessary every two hours) beginning with 25 to 50 mg. and increasing it in increments of 25 mg. until the patient is relieved. Intercostal block has been practically eliminated by this regimen. To accomplish a satisfactory nerve block, good positioning of the patient is necessary and if such manipulation

can be avoided, the patient will profit by it. A hastily and inaptly performed intercostal nerve block can also add to the accumulated difficulties if a pneumothorax is inadvertently produced.

The remainder of the patient's management is similar to that given most thoracic surgical patients and full attention can be diverted to concomitant injuries.

When tears or punctures in the underlying lung are large and air leakage rapid, various types and degrees of suction can be attached to the water seal drainage system. If future findings demand, enzymatic therapy should be instituted, pockets aspirated, or additional closed thoracotomies performed. Definitive procedures are carried out after the patient's condition has stabilized to the point of accepting them without undue risk.

Open Wounds. These may be penetrating, lacerating or perforating. The wounds may be small in diameter or there may be large chest wall defects with exposed underlying viscera. It is obvious that vital structures cannot be injured too severely or the patient would not reach the point of available treatment. Usually if a defect exists lacerated lung with injured chest wall and pericardium and diaphragm are seen through the sucking wound.

The treatment depends largely on the degree of injury. Superficial wounds are treated as elsewhere by debriding, cleansing and suturing. If the pleura has been entered it is necessary to drain the pleural space. If intercostal bleeding is apparent it is repaired by operation. Bleeding from simple laceration or injury to the lung is self-limited and is treated as a closed injury after the chest wall is closed.

Large sucking wounds offer the problem of the wound itself in addition to a wide open hemopneumothorax and associated derangement in cardiopulmonary physiology. Emergency treatment consists of closing the wound by dressings and suture technics until definitive care is available. The latter consists of debridement, surgical attention to injured viscera and plastic or prosthetic closure of the chest wall. Retained missiles larger than one centimeter are usually removed especially if they lie near some vital structure. As emphasized previously after the open wound has been converted to a closed one, the management is the same as for the latter.

Chylothorax. This is fairly uncommon. The sign and symptoms are those of hydrothorax and the diagnosis is established by thoracentesis and examination for chyle. The treatment is usually conservative, namely, repeated aspirations along with high protein diet. Closed intercostal drainage may suffice in more difficult cases. Occasionally thoracotomy with ligation of the thoracic duct is found to be necessary.

Diaphragmatic Hernia. Rupture of the diaphragm should be considered in all severe injuries to the chest. Open wounds readily reveal defects of the diaphragm; however, in closed injuries the defect may be less obvious and barium studies should always be done before the patient is discharged from care.

Thoracotomy is necessary for its repair.

Mediastinal Injuries. Severe mediastinal injuries are seldom seen since this group usually succumb before treatment can be instituted. The main cause of death being hemorrhage from the great vessels. Occasionally mediastinal emphysema is severe enough to cause symptoms such as dysphagia, dyspnea and hoarseness. This is best treated by a low collar incision in the neck and dissection of the anterior mediastinal tissues from the sternum (pretracheal space) thereby releasing any trapped air that may be producing significant pressure symptoms. Ordinarily this can be accomplished simultaneously with tracheotomy. It is important not to suture a tracheotomy wound for just such an eventuality.

Esophageal Injuries. These are rarely seen with closed injuries but when present must be repaired promptly by thoracotomy. The signs and symptoms are there of a hydropneumothorax with severe pain and prostration. Very few esophageal injuries are seen with open wounds of the chest since adjacent vital structures are injured along with the esophagus and therefore the patient succumbs before aid is able to be offered. Those that live are managed as above.

Heart Injuries. All degrees of trauma may be seen from superficial contusion to laceration and penetrating wounds. Contusions behave much like infarctions and can be managed in similar fashion. Lacerations must be sutured.

Hemopericardium is treated by repeated aspirations or by thoracotomy with repair of the heart wound. Cardiac tamponade must be

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considered in all wounds in and about the midline or adjacent to the mediastinum. The signs of cardiac tamponade are rapid, weak, feeble pulse, decreased systolic pressure, increased venous pressure and narrowing of pulse pressure. It must be remembered that contusions may produce bleeding within the pericardium from the injured heart muscle.

Traumatic Asphyxia. The accepted cause of this condition is sudden compression or crushing injury of the thorax and abdomen for sufficient time to retard or completely halt respirations. Unconsciousness may be transient with possible disturbance in vision and hearing. The patients exhibit various degrees of violet-blue to bluish-black discoloration of the face and neck. In the majority of victims the clavicles form the lower limits of discoloration. The bluish color begins to fade in 2-5 days and it may take 2-4 weeks for clearing to become complete.

Fracture of the sternum. This may occur with open or closed injuries of the thorax or may be infrequently present without fractured ribs. Diagnosis is not difficult what with the protruding type of deformity. Treatment is like that given fractured ribs with some modifications. Hyperextension of the neck and thoracic spine is used to aid in reduction. Once reduced realignment is seldom necessary to repeat. Rarely open reduction is required.

Blast Injury. This is a form of chest injury which occurs in individuals closely exposed to detonations of high explosives. The injury may be fatal without much external evidence of serious injury, however, not infrequently bloody fluid can be found escaping from the mouth and nose. Surviving victims in addition develop hemoptysis, pleurisy and cardiopulmonary collapse. Shock waves produced by explosions are transmitted with such force to the body as to produce hemorrhagic lesions in the viscera especially the lungs. On section the lungs may show confluent areas of hemorrhage. Treatment is essentially symptomatic with emphasis on bed rest, oxygen, etc.

Thoraco-abdominal Injuries. These are usually very serious, carry a high degree of mortality and demand the best in diagnostic acumen and treatment. In their management shock must be combatted but it should be remembered operation may be necessary when continued bleeding is in evidence even before all vital signs have stabilized. With open pneumothorax early operation is indicated with exploration of the abdomen through the diaphragm. Throacoabdominal incisions are useful to expose injuries to the chest and abdominal viscera. Rarely it may be necessary to explore the chest and abdomen through separate incisions. Drainage of the subdiaphragmatic area should be carried out in practically all combined wounds.

BIOLOGIC WARFARE

H. D. Ketcherside, M. D.
Phoenix, Arizona

EVER since man has known that microorganisms cause disease, there has been speculation and fear that they might be intentionally used to harm an enemy, and so far there has been no proven instance of their ever having been so used. However, since warfare has changed to total war, no estimate of an enemy's capabilities is complete without including the possibility of biologic warfare.

Natural limiting factors exclude a great many agents as suitable for such use. However, the following must be considered: viruses such as those causing influenza and psittacosis; Rickettsia such as those causing typhus and Q. fever; bacteria such as those causing typhoid and cholera, or those which cause tularemia and plague; fungi such as Histoplasma capsulatum and Actinomyces; and toxins such as that produced by Clostridium botulinum.

It is thought that to be most effective, these agents would be introduced through the air. This could be done by introducing them into the general atmosphere over a target area, or introducing them into the circulating systems of buildings. They might also be introduced into the water supply.

Defense against biologic warfare rests almost entirely upon those with professional and technical training, who are charged with peacetime health and medical activities, operating within the framework of Civil Defense organizations and under the director of Civil Defense health services.

Detection and control at the present time

would depend almost entirely upon the alertness of the physicians and health authorities in recognizing and isolating early cases. While the city water supply is examined daily, the examination consists of determining the presence or absence of Colon bacilli, and would be entirely inadequite for detecting biologic agents.

I feel that by far the greatest danger lies in the use of virus agents to infect cattle, hogs and poultry, since the only method of control is to isolate and destroy the entire herd. Few people realize how dependent we are on animal products for our very existence and how short the supply is at all times. This, however, is in the field of the veterinary surgeons, who are making a serious study of the problem.

CIVIL DEFENSE
EMERGENCY BLOOD TRANSFUSION

Prepared by the Tucson Blood Center and the Southwest Blood Banks from FCDA Technical Bulletin TB-11-5

THIS bulletin recommends minimal procedures for blood transfusion in civil defense emergencies. It describes procedures for the initial emergency or *O-P phase* when cross-matching will be impossible and only group O blood, plasma, or plasma volume expanders can be relied upon; the *transitional phase* when group-specific transfusions, employing emergency techniques, will begin; and the *recovery phase* when standard techniques for group-specific transfusions will be reestablished. These minimal procedures are not intended to be used when conditions permit the proper handling of blood. Improper handling of blood for transfusion leaves no margin of safety.

Ideal Conditions for Blood Transfusion

Blood transfusion is reasonably safe under ideal conditions. These include proper collection, processing, storage, distribution, crossmatching, and administration of blood. All phases in the handling of blood should be carried out under aseptic conditions, and approved techniques are required throughout. All donors should be medically screened to assure their safety and to exclude potentially infectious blood. All sera used in typing and serologic tests should be standard with regard to potency and specificity. Careful identification of donors, blood bottles, and recipients can only be accomplished through accurate labeling and recording. This is especially important during crossmatching.

O-P Phase

The initial emergency period following a major disaster is called the O-P phase to emphasize that only group O blood and plasma (or plasma volume expanders) can be relied upon during the first hours. Blood of group O can be administered without prior crossmatch to any person requiring emergency transfusion. This must be accepted and planned for, since facilities for grouping, Rh typing, and crossmatching may be lacking for 12 to 24 hours, or possibly longer. Even if certain nearby hospitals are relatively undamaged, available technicians will have more than they can do to meet the immediate demand for group O blood. *Grouping-specific transfusions must not be given on the basis of blood-typing records from identification cards, tags, or marks without careful crossmatching.* Therefore, plasma and group O blood are used until laboratory services can provide properly grouped, Rh-typed, and crossmatched blood for group-specific transfusions.

In the O-P phase, casualties requiring whole blood will be those exsanguinating injuries, especially those who need major surgery for resuscitation; these will be in the minority. *Group O blood must be given without regard to blood group or Rh type of the recipient in the initial emergency period.*

If group O, Rh negative blood is available without facilities for Rh typing of recipients, it should be reserved for those with exsanguinating injuries in the following priority:

(a) Young women and female children.

(b) Women who have had children.

(c) Persons who have had multiple blood transfusions.

If group O, Rh negative blood is available, and Rh typing of recipients can be done, Rh negative blood should be given to Rh negative patients. This will prevent Rh sensitization.

If low-titered group O blood is available, it should be given preferentially to persons who will require many transfusions, since large amounts of high-titered group O blood may cause destruction of the recipient's own red cells. (If available, A and B blood group sub-

stances should be added to group O blood with undetermined titer.)

Only group O blood can be given to group O recipients, since bloods of other groups are not compatible. High-titered group O blood, when so identified, should be given preferentially to group O recipients.

Plasma and plasma volume expanders are indicated in emergency treatment of shock due to hemorrhage, trauma, burns, and similar conditions, when whole blood is either not available or available only in limited amounts. Under such circumstances whole blood should be preserved for those cases where hemorrhage has been profound and resuscitation can be accomplished only by replacement of red blood cells. In all cases of shock due to severe hemorrhage or burns, plasma and plasma volume expanders should be given only in amounts necessary to meet the acute emergency of shock, and whole-blood therapy should be instituted as soon as possible to correct the complicating anemia. The majority of the injured will probably not suffer severe blood loss and therefore will not require immediate or subsequent whole blood transfusion. Plasma and plasma volume expanders have the advantage of immediate use without prior grouping or crossmatching and will not cause Rh sensitization.

Transitional Phase

A transitional phase in transfusion operations will follow the O-P phase, beginning perhaps in 12 to 24 hours, and possibly continuing for 48 hours. Some group O blood will still be used, but the use of group-specific transfusions, employing emergency procedures, will begin during this phase.

Recovery Phase

As soon as possible, standard accepted techniques for group-specific transfusion should be reestablished using the slide-test methods for ABO Blood grouping, Rh typing, and crossmatching. The test-tube cross-match technique should always supplant the slide technique as soon as facilities permit.

Group-Specific Transfusions

Only blood of group O can be given without crossmatch, and this is strictly an emergency procedure. Transfusions of unmatched group O blood should be abandoned as soon as conditions permit to conserve it for group O recipients. Donor blood of the other groups must always be cross-matched with blood from the recipient before administration.

Donor blood of the recipient's blood group should be selected and the two should be carefully crossmatched with a technique which will reveal both blood group and Rh incompatibilities. Although Rh negative blood can be given safely to Rh positive persons, the supply will be limited and should be reserved for Rh negative patients.

During the transitional phase, and when limited blood grouping and matching facilities are becoming available, it may be desirable as a first step to expand collection of blood to include group A in addition to group O donors. Group O blood can then be crossmatched for group O and group B recipients, and group A blood for group A and AB recipients. It is important that the major side of the crossmatch (donor cells and recipient serum) be double-checked for compatibility when cells of different groups are matched.

Processing Blood Outside a Disaster Area

All facilities surrounding a distaster area should be alerted immediately following an attack. They should collect and process all group O blood available from the population, indicating Rh positive or negative. Blood which is not group O may also be collected, processed and stored for use in the recovery phase or for conversion to plasma or its derivatives (groups A and B are ideal for plasma processing).

Emergency Processing of Blood In or Near a Disaster Area

During an emergency it may be necessary, in and near the disaster area, to compromise the accepted methods for processing blood under ideal conditions.

Selection of Donors

Usual standards for selection of donors may have to be lowered temporarily as follows:

(a) History of past disease (syphilis, malaria, or viral hepatitis) in a donor may be temporarily ignored except in cases where the disease, even though mild, is still active.

(b) Usual age and minimum-weight limits in donors may be extended to include all apparently healthy persons willing to give blood. The minimum hemoglobin standard of 12.5 gm. should be observed, if possible.

(c) Usual medical restrictions concerning such chronic disease states as hypertension and diabetes may be relaxed if the removal of 1 pint of blood is not medically contraindicated to the

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donor. The usual donor release form should be obtained, if possible.

Determination of Donor's Blood Group

It will be necessary to select group O donors for immediate use. This must be done with skill, employing known potent reagents, and with accurate identification of the donor with the speciment of blood tested. A record card must be kept showing the donor's name, address, and results of examinations made prior to bleeding. At the same time the hemoglobin test is done, blood should also be taken from the donor's finger to peform a blood-grouping test, preferably on the donor card, as a permanent record of the blood group.

The grouping test is performed on the surface of the card (or slide) by mixing a drop of antiserum with a small drop of blood, one-quarter the volume of the serum. Anti-A serum is placed in one space marked "anti-A", and anti-B serum in a separate space marked "anti-B". A small drop of blood from the donor's finger is mixed with the anti-A serum and spread out over an about 1 inch in diameter. (The finger must not touch the serum on the card.) Another drop of blood is mixed with the anti-B serum and spread similarly. The card should then be rocked back and forth and observed for agglutination.

If neither of the serum-blood mixtures shows agglutination, the person is blood group O. If both serum-blood mixtures are agglutinated, he is group AB. If only the anti-A serum mixed with blood produces agglutination, the donor is group A, and if only the anti-B serum-blood mixture is agglutinated, he is group B. (A third space may be provided on the card for Rh typing when done as a predonation procedure, or this may be done a slide with finger blood.)

Group O donors can be selected quickly. Each donor's card, after drying, supplies a permanent record not subject to clerical error or misidentification, provided the donor's name is checked at the time his blood is mixed on the card, and again when blood is drawn. In addition, while the needle is still in the donor's vein during the withdrawal of blood, a sample must be collected into a sterile pilot tube without anticoagulant. The tube should be firmly attached to the bottle of blood and used in the laboratory for proving the donor's blood group and for Rh typing.

The slide-test method will make it possible to rapidly select group O donors when the record card, described above, is not available. In addition, this method will reveal specific blood groups as well as Rh types with the least time and effort during the transitional and recovery phases.

To prepare group O blood for emergency use without crossmatching, the blood grouping must be proved by a second procedure. This is most easily done by using anti-A plus anti-B (group O) serum.

Identification of Donor Blood

The label on donor blood must show an identifying name or number, name and address of the establishment collecting blood, expiration date, and the blood group and Rh type of blood contained in the bottle. If the manufacturer's label is the only one available, the above information must be clearly written on it in pencil or waterproof ink. (Indelible pencil should not be used because under refrigeration the pencil markings will smear and become illegible.)

Crossmatching In or Near a Disaster Area

Advantage should be taken of techniques which will disclose dangerous blocking antibodies as well as the usual agglutinating antibodies. This is particularly true of recipients who may be immunized to Rh antibodies, such as women who have had children and persons who have had previous transfusions. In performing crossmatching tests, both donor and recipient sera should be inactivated by heating for 10 to 15 minutes in a water bath at 55°-56° C. If not done, hemolysis may occur, producing a false negative report.

Both sides of the crossmatch should be set up as routine, since this takes little longer than setting up only the major side. Incompatibility on the major side indicates that the blood must not be given, since a very serious or possibly fatal reaction would result. Minor side incompatibilities, although indicating failure of complete group and type matching, do not usually cause serious reactions and may be ignored in extreme emergencies.

Administration of Blood

A sterile pyrogen-free administration set with 70 to 100 mesh in-line filter should be used. The blood must be thoroughly mixed to produce a uniform suspension. Refrigerated blood should not be warmed prior to or during administration, or allowed to stand at room temperature longer than 1 hour before use. Heat may injure the red cells and produce excessive hemolysis when

transfused. The rapid administration of cold blood should produce no adverse effect.

Mixing blood with medications or solutions which are likely to produce hemolysis or cause a precipitation of plasma proteins should be avoided. Mixing within the tubing of the administration set with other than istonic solutions is likely to produce hemolysis. Medications should not be injected into the tubing carrying blood. Administration sets should be rinsed with physiological saline if they have been used to give other solutions prior to the administration of blood. Similarly, after a transfusion of blood, the filter and tubing should be cleaned by running 50 to 100 cc. of saline thru them before other fluids are given. If saline is not available, or is contraindicated, 5 percent dextrose in water should be used.

One of the most frequent and dangerous errors in cross-matched group-specific transfusions is the administration of blood to the wrong recipient. This must be prevented by careful identification of recipients, making certain that each gets the blood crossmatched for him. Special precautions are required for persons with common names. The emergency medical tag giving full identity expedites this.

Complications of Blood Transfusions

Hemolytic Reactions

Clinically, these potentially fatal reactions to whole blood transfusion are characterized by severe lumbar pain, sense of substernal oppression, violent chills, fever, and often rapid, labored breathing, prostration, and hypotension. The severity and time of onset vary; symptoms usually appear after 50 cc. or more of blood have been given. In Rh reactions the onset may be delayed for 1 to 2 hours after the start of the transfusion. Jaundice and renal insufficiency may occur later. The mortality rate of hemolytic reactions is relatively high in patients who develop renal failure with anuria. However, those who recover usually have no residual kidney damage.

The pathogenesis of the transfusion reaction stems from the antigen-antibody reaction which occurs with the transfusion of incompatible red cells, resulting in excessive hemolysis in the recipient.

Reactions having severest consequence are due to transfusion of ABO or Rh incompatible blood. Hemolytic reactions of lesser significance may also be due to the administration of compatible blood which has been improperly stored: e.g., poor refrigeration.

Reactions may also result from improper administration of blood. This may occur with excessive heating or the improper mixing of solutions with the blood.

Reactions to Rh incompatible blood depend upon acquired isosensitivity and occur most frequently in Rh negative persons. Sensitization develops during pregnancy in about 5 percent of Rh negative women bearing Rh positive children and occurs after repeated transfusions in about 5 to 30 percent of Rh negative recipients. In general, at least 1 to 3 Rh incompatible transfusions are necessary before significant sensitivity develops. Antibodies appear in 1 to 2 weeks.

The incidence of hemolytic reactions is not accurately known, but they occur chiefly because of human error.

Treatment of hemolytic reaction consists of the following:

(a) Stop transfusion at the earliest symptom.

(b) Treat shock, if present, by the usual methods for supporting the circulation with plasma, plasma volume expanders, or known compatible blood if available. (Recheck typing and crossmatch to locate and rectify error.)

(c) Give small amounts of barbiturates to allay anxiety, or morphine if the pain is severe.

(d) Administer sufficient amounts of appropriate fluids parenterally to maintain adequate urine output and proper hydration. Fluid and electrolyte therapy is of great importance, especially if renal failure with anuria or oliguria develops.

During the acute phase of the reaction only a few casualties will be able to take fluid by mouth. The insensible loss will approximate 1,000 cc. per 24 hours. This water loss plus all measurable fluid losses should be conscientiously replaced each day. During the period of oliguria or anuria, little or no sodium will be excreted in the urine; therefore, salt intake should be carefully restricted. However, if the transfusion reaction occurs in an already dehydrated and salt-depleted patient, the judicious administration of salt and water may in itself be necessary for the maximum function of the injured kidney. Once these needs have been met, careful daily replacement of water (dextrose in water) is essential together with repeated reevaluation of the electrolyte balance of the patient.

Alkalinization of the urine should not be attempted, since the relatively large amount of sodium administered as lactate may be retained and may precipitate pulmonary edema. An alkaline solution should be used cautiously only during later stages of renal shutdown, to correct acid-base imbalance.

As long as renal insufficiency persists, there is a danger of death from pulmonary edema with the excessive administration of saline. The great majority of patients who experience transfusion reactions will survive with good renal excretory function. Despite severe oliguria, conservative treatment in most cases will be rewarded by recovery within 2 to 3 weeks. It is recommended that 100 to 200 gm. of carbohydrate per day be given the patient. This is a basic metabolic requirement and will tend to spare protein stores of the body.

Careful typing and crossmatching of both donor and recipient and accurate recordings of these data for proper identification of each bottle of blood during handling, processing and administration is obviously required for prevention of hemolytic reaction. Proper hydration of the patient being transfused is of great clinical importance. The patient who experiences a transfusion reaction and who has had adequate fluids and a good urine flow will probably suffer less severe renal damage and make a more prompt clinical improvement than the patient who is dehydrated and salt-depleted when transfused.

Circulatory Overload

Clinically, circulatory overload can be a serious complication and is characterized by pulmonary congestion and edema. The onset of symptoms may occur during or shortly after transfusion with sudden dyspnea, orthopnea, cyanosis, cough, and physical signs of pulmonary edema. These are the symptoms and signs which accompany an excessive increase in blood volume due to transfusion of any solution at too rapid a rate or in too great an amount. Older people and those with heart disease are especially susceptible, and caution should be exercised with these persons.

Treatment should be prompt and the transfusion stopped with the onset of symptoms and signs of circulatory embarrassment. Oxygen should be administered if available. Tourniquets applied to all four extremities (to stop venous but not arterial flow) will give relief in a large number of patients. In some cases phlebotomy will be necessary.

Prevention of overloading the circulation is contingent on the medical evaluation of each clinical situation. The rate of infusion should not exceed 5cc per minute at the start of the transfusion, except in the presence of shock.

Pyrogenic Reactions

Clinically, pyrogenic reactions are the most common. They are characterized by chills and fever occurring during or within 1 hour after transfusion and usually lasting less than 4 hours. They may be mild or very severe with violent chills and fever of 104 or 105° F. Recovery is generally complete within 24 hours. If there is difficulty in distinguishing between a pyrogenic and a hemolytic reaction, the finding of an abnormally high amount of bilirubin in the serum will be conclusive evidence of a hemolytic reaction.

Treatment is symptomatic along with prompt discontinuance of the transfusion if the reaction is severe.

Contaminated Blood

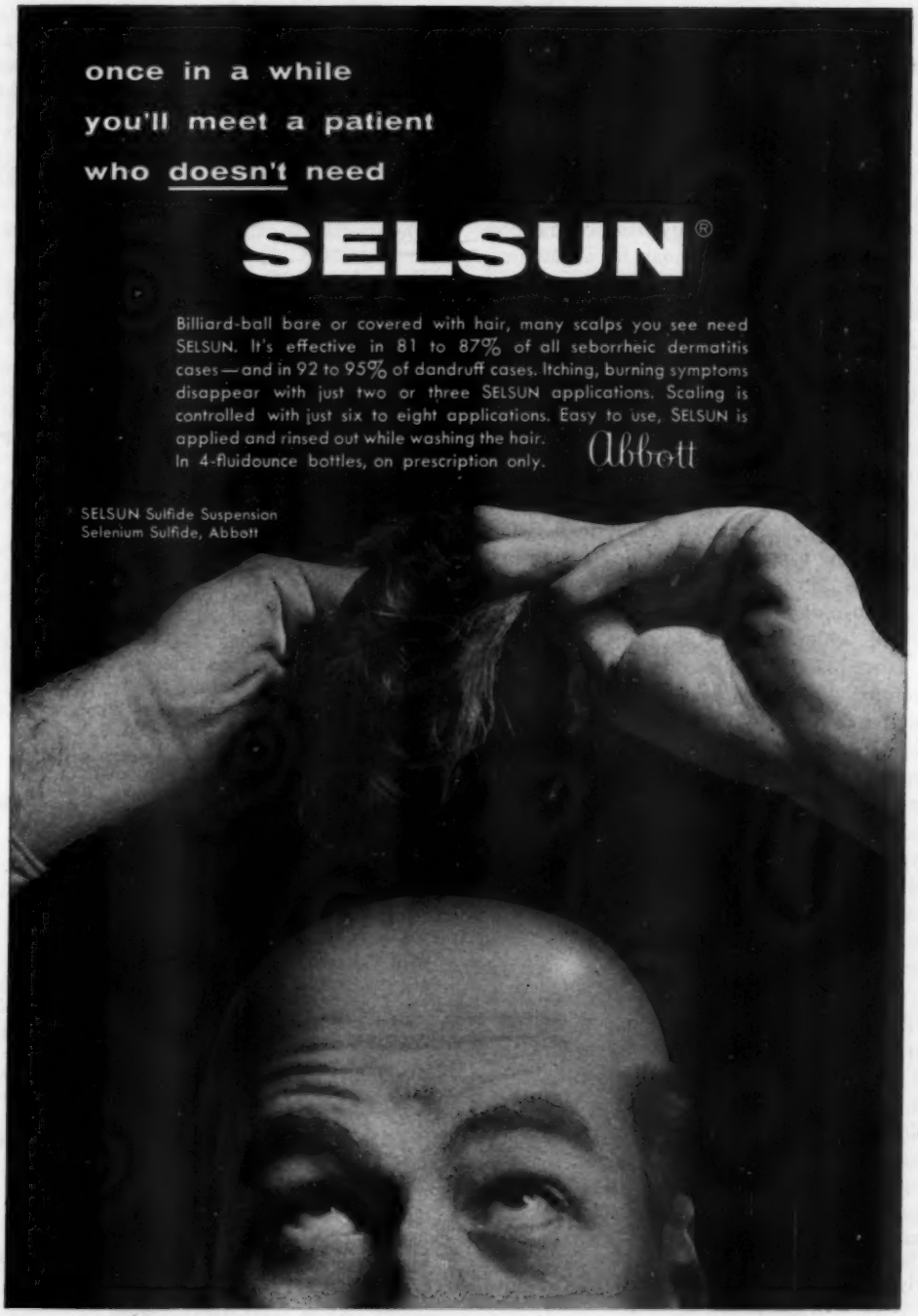
Grossly contaminated blood must not be given under any circumstances. If inadvertently given, the patient will show symptoms and signs of being severely and acutely ill with a bacteremia. Treatment should be prompt, with large doses of available antibiotics, adequate treatment to combat shock if present, and the necessary symptomatic care.

If possible, the bottle of blood should be returned to the laboratory for culturing and identification of the specific organism so the patient can be treated with appropriate antibiotics.

Allergic Reactions

Clinically, an allergic reaction is common and usually characterized by urticaria and occasionally by angioneurotic edema, severe or giant urticaria, and asthma. The urticaria, generally localized, appears during or soon after transfusion. Patients with severe reactions develop asthma or angioneurotic edema, the most dangerous variety involving the glottis. Duration rarely exceeds a few hours.

Treatment is entirely symptomatic. In mild cases 0.3 to 0.5 cc. of 1:1,000 solution of epinephrine can be given subcutaneously. This dose may be repeated at intervals of 20 minutes to 1 hour. In severe cases 0.5 cc. intramuscularly or 0.3 cc. intravenously may be needed. Antihistaminic drugs may be helpful. Usually the transfusion can be continued in the milder urticarial reactions, but if asthma or angioneurotic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edema appears it should be stopped immediately.

Transmission of Disease

The practice of accepting as donors only those who state they are in good health, and who, on examination show no apparent evidence of active illness, eliminates most of the disease transmission hazard in blood transfusions. There are, however, three known instances in which these criteria are not adequate:

(a) Syphilis, during the spirochetemic stage, especially before the serology has become positive or the chancre noted, may be accidentally transmitted to a recipient. Penicillin therapy should of course be given if this occurs. Prevention is partially accomplished by careful screen- of donors and may be assured by refrigeration of blood collections for at least 72 hours before use since the spirochete survives less than 72 hours in blood stored at 0 to 10° C.

(b) Malaria is transmissible by blood transfusion. Plasmodia may appear in the bloodstream years after an attack of the disease without producing symptoms. In addition, plasmodia may not be detectable by blood-smear examination because of their insufficient number. Therapy with chloroquine, kuinacrine, or quinine will cure malaria transmitted by transfusion. Prevention of malaria in recipients lies entirely in the rejection of donors with a history of malaria or those who have had intensive suppressive therapy without clinical manifestations. The malaria parasite survives in stored blood as long as the red cells, and is not destroyed by refrigeration.

(c) Hepatitis can be transmitted by blood or plasma from donors who are asymptomatic carriers or are in the prodremal stage of the disease. The viruses of both infectious hepatitis and of homologous serum hepatitis are transmissible by transfusion. Incubation periods vary from 1 to 6 months. At present, prevention can only be partially effective by rejecting donors with jaundice or known liver disease, or a history of either type of viral hepatitis, and donors who, within a 6-month period, have had blood or plasma transfusions, or have been intimately exposed to a case of infectious hepatitis.

Tetany

The sodium citrate used as anticoagulant may rarely produce tetany following rapid transfusion of large amounts of blood and plasma, especially to infants. Therapy consists of intravenous injection of calcium gluconate to restore a normal concentration of free calcium ions in the circulation.

Air Embolism

Air embolism sufficient to cause fatality is rare. It is most likely to occur when blood is administered with pressure apparatus rather than by gravity. When blood is administered under pressure, a responsible attendant must be present constantly.

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Emergency Care of Chest Injuries — Wylie, p. 517

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Disaster Feeding — Hundley: J.A.M.A. Apr. 18, 1953 Vol. 151.

U. S. Government and Federal Civil Defense Administration Publications; Available at the Supt. of Documents, Washington 25 D.C., at the indicated price:

* Non medical

Health Services and Special Weapons Defense (AG-11-1) 60c

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Medical Aspects of Atomic Weapons (Nat. Security Resources Board 10c
Mental Health Implications in Civilian Emergency (U.S. Pub. Health No. 310) 15c
Effects of Atomic Weapons (Dept. Defense and U.S. Atomic Energy Comm.) 1.25

Publications Available Free of Charge at the State Civil Defense Office: 2019-B, N. 7th St., Phoenix, Ariz. Phone AL 8-6697.

Radioactive Fallout from Nuclear Explosions (AB No. 178) Nov. 8, 1954.

Residual Radiation in Relation to Civil Defense (AB No. 170) Feb. 9, 1955.

Operational Readiness to Provide Whole Blood in Emergency (AB No. 1845), Mar. 10, 1955.

Psychological First Aid in Community Disasters.

Training for First Aid Personnel, March, 1953.

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Emergency Care Where You Need Ia (Improvised Hospital).

Facts About the H-Bomb.

(Many other publications are available at this office including some of the FCDA bulletins listed above. Your inquiry is invited.)

Other Publications

Treatment of Chemical Warfare Casualties TM-8-285, NavMed. P-1330, AFM 160-12.

Departments of Army, Navy and Air Force: Handbook of Atomic Weapons for Medical Officers No. 8-11, NavMed P-1330, AFM 160-11.

National Blood Program, Publicity Manual — Prepared by Office Defense Mobilization.

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The Dairy Industry in Civil Defense (Milk Industry Foundation, Wash., D.C.)

Emergency Medical Care Diabetics (American Diabetes Assoc. 11 W. 42 St., N.Y. 18, N.Y.)

Nursing in Disaster (League of Nursing Education).

Disaster Blueprint for the Industrial Physician — AMA Council on Industrial Health.

Medical Aspects of Civil Defense (Reprinted series articles on J.A.M.A. on civil defense).

Rodent Control in Epidemics and Disaster U.S. Pub. Health Communicable Disease Center, Atlanta, Georgia, (also bulletins on fly and mosquito control available here).

Sanitary Engineering Problems in Disaster — McCallum, Chief Health Emergency Planning, U. S. Pub. Health Service, Dept. Health, Education, and Welfare, Washington 25, D.C.

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THE President's PAGE

HEALTH LEGISLATION

In the following table you will find an up-to-date compilation of the status of the more important health bills in this session of the 84th Congress. Bills on which there has been no significant action are ilsted at the bottom of the table. The number in parentheses after the bill number refers to this year's AMA WASHINGTON LETTER in which the bill was analyzed. When developments warrant, a revised table will be printed.

SUBJECT	BILL NO.	HOUSE	SENATE
Dr. Draft Extension*	H. R. 3005 (26)	Public Law 118, 84th Congress	
$100 Extra Pay*	H. R. 3005 (26)	Public Law 118, 84th Congress	
Disability Payments	H. R. 7225 (28)	Passed 7/18	Hearings Held
Jenkins-Keogh**	H. R. 9, 10 (3)	Reported	
Salk Vaccine Grants	S. 2501 (29) H. R. 6286 (21)	Hearings Held	Passed 7/18
Amend Biol. Law	H. R. 6207(22)	Hearings Held	
Mental Health Survey	H. J. Res. 256 (13)	Passed 4/21	Passed 7/18
Mental Health Grants	H R. 3458 (7) S. 886 (7)	Hearings Held	Hearings Held
Medical Educ. Aid	H. R. 4743 (11) S. 1323 (11)	Hearings Held	Hearings Held
Lab Research Grants	H. R. 3459 (7) S. 849		Passed 7/18
Narcotics Survey	S. Res. 67 (11)		Passed 3/18
Practical Nursing	S. 866 (7) S. 929 (9)		Hearings Held
Water & Air Pollution Grants	S. 890 (11) S. 928 (8)	Hearings Held Public Law 159, 84th Congress	Passed 6/17
Bricker Amendment	S. J. Res. 1 (3)		Hearings Held

No Progress On Following: Health reinsurance (H. R. 3458, S. 886), mortgage loan guarantees (H. R. 3458, S. 886), military medical scholarships (H. R. 4645, S. 1444), dependent medical care (H. R. 2685, S. 934), PHS grants revision (H. R. 3458, S. 886), mothers' and crippled children's grants (H. R. 3292), Medical care for the indigent (H. R. 3293, S. 1198), raising U. S. contribution to WHO (H. J. Res. 293), illness inventory (H R. 4098), omnibus narcotics control (H. J. Res. 141, S. J. Res. 19).

*The House bill to extend the doctor draft (H. R. 6057) was left to die in the Rules Committee when the Senate added the doctor draft extension to the bill extending the regular draft (H. R. 3005). The combined bill then was enacted. **This made part of an omnibus tax revision bill before being reported out.

Harry E. Thompson, M.D.
President, Arizona Medical Association

"THE HISTORY OF THE PROFESSIONAL BUILDING, PHOENIX, ARIZONA

This column will contain from time to time different episodes in the history of medicine in Arizona as reflected in the stories of it's hospitals, medical buildings, medical societies, pioneer doctors, etc. It is sponsored by the Committee on Medical History of the Arizona Medical Association. Any contributions to this subject are always welcome. — ED.

THE story of the building of the Professional Building is a fascinating tale compounded of circumstances, growth of Phoenix, conditions of medical practice, and in particular, the history of one man, Roy Wayland. His early experience in Arizona, his knowledge of the growth of the community, his popularity with the doctors, and finally his freedom to develop this gigantic development at a time when the deepest depression the country had ever known was in full swing, were fortuitious conditions of this building's existence.

Coming to Phoenix in 1901, Wayland first went to work as a druggist for the Bear Drug Company. During that early period to 1903 he also served as a clerk in the Territorial Legislature. Then for nine years, he worked in and operated a company drug store at Clifton dispensing under the medical director, Dr. Harry Horn. During this same period Dr. A. M. Tuthill was physician for another company in the area. About 1912 Wayland returned to Phoenix and purchased the Lovett Drug Company and stayed in this location at Washington and Central, till selling to the Walgreen chain in 1929. At the time he acquired this drug store the annual gross was about $25,000 and in 1928 it was over $500,000. The corner was at the cross roads of the state during that period, and the owner was necessarily in on much of the civic development and growth of Phoenix.

Soon after Wayland came back to Phoenix, Roy Goodrich wished to raise his Goodrich Building from four to six stories, started the project and had to have help in finishing it, which gave Wayland a chance to do a good turn for Goodrich and the doctors and dentists at the same time. His popularity with the profession was also based on cooperative business principles, and he employed first class druggists for the prescription department, which had no peers during that time. The Goodrich Building was the principal medical center, with such men as Win Wylie, E. Payne Palmer, Geo. Goodrich, Fred Holmes, Alex Tuthill, Ansel Martin, and W. W. Watkins, William A. Schwartz, Harry Gudgel, Delamar Harbridge officing there.

All during the twenties, the Goodrich Building became less and less adequate, and with Phoenix doubling in population, medical office space was hard to find. In 1929, Wayland went into an agreement with Schram Johnson of Salt Lake City, and others to form a drug chain in five mountain states and west Texas. The Walgreen Drug of Chicago was looking for western connections, and persuaded the group to sell out to them. Arrangements were completed before October for Walgreen to take over Waylands store on January 1, 1930, with the only stipulation that he would not start a store within two blocks of the original site. This arrangement was concluded before Wayland had any notion of starting another medical building project. So he found himself in possession of $90,000 cash plus something for good will, at a time when cash was hard to come by. Liquid assets were rapidly disappearing all over the United States after November, 1929.

Now let us turn for a moment to the general situation of medical practice in the twenties. Phoenix had prospered, and the town was not over supplied with doctors. Most medics were

HBA FOR SECURITY

THE HOSPITAL BENEFIT Bulletin

Special Published Bi-Monthly by Hospital Benefit Assurance, First Street at Willetta, Phoenix August, 1955

TIMELY SUGGESTIONS FOR SURGEONS

HBA is vitally interested in the surgeon's operations — those he performs as well as the business end of his operations — and we ever strive to be as helpful as possible. We do try to cut the corners in our business operations to save you time and trouble. These few suggestions will give you a quick newsflash summary of HBA's operations in relation to your own.

No Red Tape

It is the aim of HBA to so handle payments of surgical and hospital bills that all concerned will be spared of any trouble.

The fact that around 96% of the hospital admissions are handled and paid without claim forms bespeaks the advantages of HBA's time-saving, trouble-saving activities.

The key to this overall convenience is the HBA Membership Card. On being admitted, the Member simply turns his card over to the hospital. If the patient has surgical protection and an operation is indicated, the surgical bill form is furnished for the surgeon so that we can determine the amount payable in accordance with the surgical procedure.

This expediency obtains in all but very few cases. For example, in the case of a new policy HBA may require additional information to determine whether the patient is eligible for payment. We do not pay for conditions which existed prior to the patient's membership in HBA.

Further, in connection with sub-standard risk, more detailed information is necessary to determine eligibility, since protection may be limited because of such risks.

All told, the HBA convenience-for-all "system" has been highly lauded. And HBA is proud of the fact that we can hold the number of cases down to approximately 4% on which we ask the patient or the attending physician to fill out claim forms.

Whenever we can minimize detail, and thus conserve the surgeon's time, we always do so.

HBA Doesn't Set Fees

While HBA has a schedule of fees for surgical operations, anesthetist fees, X-rays for emergency accident treatment, etc., there is no attempt on the part of HBA to convey to the patient that this schedule of fees is absolute.

"Amounts in excess of that payable according to our schedule of surgical benefits should be billed to the patient" is the clear statement on our surgical bill form which the patient presents to you for submitting your charge to HBA.

Many surgeons do charge the exact amount allowed by HBA. They have concluded that the fees will average out all right. Some operations are more difficult, of course. But on the easier ones, they also receive the full fee. Doctors in the South often charge smaller fees than those in the HBA schedule. However, this matter of fees is strictly between the physician and his patient. No attempt is made by HBA to interfere with this relationship.

"He's out back teaching Junior about the birds and the bees."

Sub-Standard Risks

Hospitalization and surgical insurance written on a non-group basis actuarially requires that such risk be a standard risk. That means the insured must be in ordinary good health.

This is not necessary in the group category, because the law of averages will take up the slack, so to speak. Though there are one or two poor-health persons in the group, a like number who are in excellent health, and others in between — the average may be considered "standard risk".

But in writing a non-group policy it would be disasterous for a company to accept only people in poor health. For, in time, the company would have nothing but poor risks. Then the rates would have to be raised so prohibitively high that those who are in ordinary good health could not afford coverage with that particular company.

HBA does make every effort to write as many sub-standard risks as possible. Sometimes this can be done in the form of an Endorsement which limits their coverage. For example, the person who has a hernia knows that he will need surgery some day. HBA will write that individual, but with a written understanding that payment cannot be expected from HBA for that particular operation.

Sub-standard business, especially that which is quite sub-standard, is not particularly desired by HBA, but is written more or less as an accommodation to the person desiring HBA general protection. It is mostly when other members of the family, who are standard risks, desire protection that we include sub-standard risks.

as busy as they wanted to be. There was no county hospital or medical service outside of a county physician and volunteer services in the general hospitals for which the county paid hospitals $3.00 per patient a day.

Aside from a short sharp shock of depression in the early part of the decade, Phoenix was in one of its boom periods. Cotton was king in the valley, much as it has been in the past six years. It was natural, therefore, that plans for new medical buildings were blooming. One of the most interesting was that of Coit Hughes and Hattie Mosher. Dr. Hughes was county physician, and a power politically, although a bit short on capital. Hattie Mosher had money when she came to Phoenix at the beginning of the century, a scion of the Denver Post owner, but her dreams in Phoenix had ended largely in disappointment; two structures on Central Avenue were started then boarded up and under constant court action for the collection of taxes and indebtedness against the old lady. As she wandered about town from court room where she was her own lawyer in countless suits, to her unfinished framework of a building on Central north of the Van Buren corner she was a picturesque figure, in an old black lace gown, and hats thirty years out of style. Now she wanted to start a medical center building.

This plan never got to first base because of lack of confidence in the parties of the planning. There were other propositions. Dr. Robert Craig drew up a plan and invited the Pathological Laboratory and other key figures from the Goodrich Building group to join in financing and constructing a building which would have been at the McDougall and Cassou location. When it was found that Dr. Craig was not able to put up the principle sum for completing the structure, the docotrs withdrew their support, and it was abandoned. Mr. Johnson from Denver was controller manager of the Westward Ho at the time (1929), and he offered financial support to a project to be built on the NE corner of Van Buren and First Avenue. Boarding off of the corner for construction made it seem that

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in rheumatoid arthritis
more potent
than other corticosteroids
lessened incidence
of sodium retention
and potassium depletion
*T.M.
METICORTEN,* brand of prednisone.

the project was well on its way, but Johnson had a heart attack and the stock market crash finished any hope for completion of the preliminary arrangements.

A group of promoters came over from California, and went into huddles with many of the local doctors and dentists. Their propositions seemed to involve the paying of fees and commissions for practically everything in the promotion line, and the final meeting broke up with nothing settled. During the course of these discussions Roy Wayland who was in on them, became disgusted with the plans, and said to one of the doctors, "well, if you get a building, all right; but if you don't, I'll build you a building." Before long they came back to him, called his statement and he had to make good on it. He was invited to attend a meeting of the Maricopa County Medical Society, early in 1930. John McLoone was president and Victor Randolph was secretary. The needs of the members received an airing, and the upshot of the meeting was that if it was their desire to go ahead with a building, and if their co-operation would be forthcoming, Wayland would proceed with the preliminary plans and see if financing could be obtained.

The Valley Bank and Trust Company was then occupying the space on West Adams next to what is now the Flame Restaurant, then the Grand. The bank's lease on the property expired in March, 1930, and the option to renew contained in it that the lease was to provide an option to renew for five years at $1250.00 per month and an additional five years at $1500.00 per month. Continued occupancy of the space would have necessitated considerable expense for remodeling. The bank owned the property at the corner on which the Professional Building now stands, having acquired it in 1907, at a cost of approximately $63,000.00. In 1929, a definite offer of $330,000.00 had been submitted to the officials of the bank and refused by them. While land values took a dip in the 1930's, comparable business property in the 1950's is valued at higher rates.

Shortly after the medical meeting on February 21, 1930, Wayland submitted a prospectus of a new building to be erected on that site to the Board of Directors of the Valley Bank. Previously, the Bank had been considering a one or two story construction of banking facilities only. At a meeting in April he was asked to submit plans for a larger structure to house the medical and dental profession, and was appointed chairman of a building committee to study and further the possibility of constructing a building. Thus, early in March, 1930, Wayland began an intensive round of discussions and conferences with doctors and dentists, architects, and bank people. Tentative leasing of space was begun. For each of the upper six floors of the proposed building, one or two key men were chosen who helped in securing commitments of other medical men and of dentists with the amount of square footage desired. As the plans took shape these agreements were drawn into contracts and leases by Mr. Gust whose law firm was to be the only legal group to occupy the building.

Architects Morgan, Walls, and Clements of Los Angeles were retained with local architect H. H. Green, who was to occupy the second floor of the building for many years, as associate. The Valley Bank leased space for itself and accepted common stock in payment for the lots on which the building was to stand.

By June 16, 1930, the architect submitted first plans and estimates. The Building Planning Service of the National Association of Building Owners and Managers was brought to Phoenix, comprising men from all sections of the United States. The minutes of the meetings of the planning group represented a bound volume of 213 pages. The medical group supplied the name THE PROFESSIONAL BUILDING.

The success of the entire project rested upon the extent to which Wayland was able to satisfy the varying wishes of the medical and dental professions. He made many of the arrangements personally, spent hours going over details with prospective tenants, brought groups of professional men who might have been unable to get together by themselves into the project. No commissions were charged on loans, no commissions went to anyone on rentals of space, no salary was drawn for services until the building was occupied. Tenants were not required to pay cash for partitions and in most instances, they signed notes which were paid out as rent. Although the contracts called for an increase in rent at the end of two years from the original rate of $2.50 per square foot per year, the building gave tenants relief because of the prolonged depression and rents were stationary until 1943.

The building further kept up space on the twelfth floor where the Maricopa County Library was housed. Dr. W. W. Watkins had, with Dr. O. H. Brown kept the nucleus of a

library for years prior to 1932 and served on the Library Board as well as the writer, although we had no money from the County Society to pay a librarian until about 1939.

By January 1931 the plans were completed. A substantial part of the financing had been underwritten by the Security First National Bank of Los Angeles and nearly half of the financing was by stock shares sold locally.

The L. E. Dixon Construction Company of Los Angeles who had built the Security Building, and the Phoenix Court House and the City Hall was awarded the contract and excavation began March 12, 1931. The contract provided a $30,000 fee to the contractor as overhead and profit and specified a maximum guaranteed cost to the owner. The Dixon Company completed the construction at a total cost materially less than the agreed price and all of this having reverted to the owners in spite of provision in the contract that the contractor should participate in any savings which might be effected.

Le G. Moore came with the Dixon Company as cost accountant and payroll supervisor and two years after the completion of the building, he came back to take over the building management.

Excavation for the basement and foundation footings extended down twenty-five feet at which level an old river bed was found. An Indian ax head was found in the gravel at this depth. Six inch pipes were required to carry water from the excavation to the street to permit pouring of concrete footings.

The framework of the building is structural steel. A one hundred ten foot boom was erected to handle the steel girders and beams; after the lower levels of frame were in place, the derrick was moved to the top, towering over two hundred feet above street level. The height of the building was 183 feet, 4 inches.

During construction, conferences with the doctors and dentists were being held to complete the plans, for their individual sites and 74% of the space was leased during the first year it was opened. The total amount of rentable floor area was 88,914 square feet. The lower floor space began to be occupied December 1, 1931. The bank moved February 21, 1932.

The following is a list of the Doctors and Dentists who moved into space in 1932 with the amount of rent space taken.

PHYSICIANS	Sq. ft. of space occupied
Pathological Laboratory	4717
Dr. Harland P. Mills	
Dr. Warner W. Watkins	
Dr. L. A. W. Burtch	341
Dr. David D. Davis	652
Dr. A. C. Kingsley (Ind. Comm.)	1364
Dr. E. Payne Palmer, Sr.	1649
Dr Frank Milloy	
Dr. Dudley Fournier	
Dr. John H. White	
Dr. William A. Schwartz	1333
Dr. B. L. Melton	
Dr. T. T. Clohessy	341
Dr. Harry J. Felch	511
Dr. S. D. Little	713
Dr. H. M. Purcell	682
Dr. Orville H. Brown	1819
Dr. Trevor Browne	
Dr. A. J. McIntyre	388
Dr. Henry L. Franklin	341
Dr. Louis B. Baldwin	511
Dr. James L. Johnson	512
Dr. L. H. Thayer	512
Dr. Willard Smith	682
Dr. D. F. Harbridge	652
DENTISTS	
Dr. John C. Austin	208
Dr. H. A. Berry	341
Dr. A. J. Jensen	
Dr. George H. Chiles	341
Dr. H. L. Henry	341
Dr. R. L. Dunlap	490
Dr. Franklin R. Smith	341
Dr. E. M. Pafford	512
Dr. Robert A. McCall	512
Dr. John I. McCall	
Dr. Edgar B. Pease	336
Dr. Claude M. Moore	490
Dr. L. O. Spillane	200
Dr. James L. Borah	901
Dr. Logan D. Dameron	341
Dr. Paul J. Ritchie	341
Dr. Lloyd C. Mason	396
Dr. R. Dean Creamer	286
Dr. Thos. W. Firth	341
Dr. H. J. Jessop	341
Dr John A. Lentz	341
Dr. H. H. Branton	341
Dr. William A. Baker	445
Dr. W. G. Barackman	512
PHYSICIANS	
Dr. A. M. Tuthill	748

Dr. Norman Ross		Dr. Kimball Bannister	1050
Dr. Harry B. Gudgul	490	Dr. Leslie R. Kober	
Dr. Harry R. Carson	511	Dr. Louis Dysart	512
Dr. Edgar Brown	341	Dr. Palmer Dysart	
Dr. Benjamin Herzberg	341	Dr. Fred C. Jordan	512
Dr. George E. Goodrich	2671	Dr. Forrest L. Reese	512
Dr. Vernon Kennedy		Dr. J. M. Greer	1137
Dr. Jesse D. Hamer		Dr. S. I. Bloomhardt	512
Dr. Robert S. Flinn		Dr. E. A. Gatterdam	210
Dr. D. R. Gaskins	495	Dr. Harvey E. Moss	281
Dr. Fred G. Holmes	1333	Dr. Charles B. Palmer	376
Dr. Victor Randolph			
Dr. Howell Randolph			
Dr. George Shields	1023		
Dr. Hillary Ketcherside			
Dr. Carlos Craig	310		
Dr. J. J. McLoone	1478		
Dr. O. W. Thoeny			
Dr. Thomas W. Woodman	581		
Dr H. K. Beauchamp	316		
Dr. T. E. McCall	264		
Dr. James E. Dione	280		
Dr. Edwin C. Bakes	646		

Howell Randolph, M. D., for the Committee on Medical History of the Arizona Medical Association.

CIVICS By Dr. Norman A. Ross, has been omitted from this issue due to the featuring of CIVIL DEFENSE material.

METICORTEN
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lessened incidence
of sodium retention
and potassium depletion
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Woman's AUXILIARY

ARIZONA

Mrs. Brick P. Storts
Tucson, Arizona

AS president of the Woman's Arizona Medical Auxiliary to the Association, I am proud to submit the following report for the year 1954-1955.

ORGANIZATION – There are 5 organized counties, with a total membership of 497 out of a possible 650. This is an increase of 56 members over the previous year. The greatest number of new members are in the 2 largest auxiliaries where a membership coffee or tea is given each fall. Great distances in Arizona make the organization of some counties impractical. Wives of physicians residing in such areas are urged to become members-at-large. They are sent personal letters concerning projects of the Auxiliary.

A newsletter is sent out 3 times a year to every doctor's wife in our state. The president and president-elect have visited the organized counties during the year. Much interest in auxiliary work is stimulated by this personal contact. Each group is most hospitable and enthusiastic. Four regular Board of Directors meetings are held each year.

PROGRAM – "Leadership in Community Health", the theme suggested by our National President, has served as the basis for the State Auxiliary program throughout the year.

Most groups had outside speakers (at regular meetings) to discuss Civil Defense, Legislation, Nurse Recruitment and Mental Health. These lay people were usually specialists in their field. Thus doctors' wives were able to learn how best to serve their community as health leaders. This is also an excellent liaison between the lay and medical groups. Most auxiliaries had a social hour during their meetings when husbands were occasionally invited. This type of sociability is most important in order "to cultivate friendly relations and promote mutual understanding among physicians' families." The School of Instruction for officers and committee chairman was again given during State Convention.

PUBLIC RELATIONS – Our State Chairman reminded us at the first Board Meeting that Public Relations offer a job for every doctor's wife. In Arizona, I am sure that this statement has been taken literally by each Auxiliary Society. One group, with 14 active and 15 associate members, sponsored a Charity Ball where over $4000 was raised for the local community hospital. They also netted $370 from a rummage sale. This same small auxiliary cooperated with their County Medical Society to sponsor a booth at the County Fair in commemoration of 50 years of medical service to the County. The booth merited the $100 first place award for the best community exhibit.

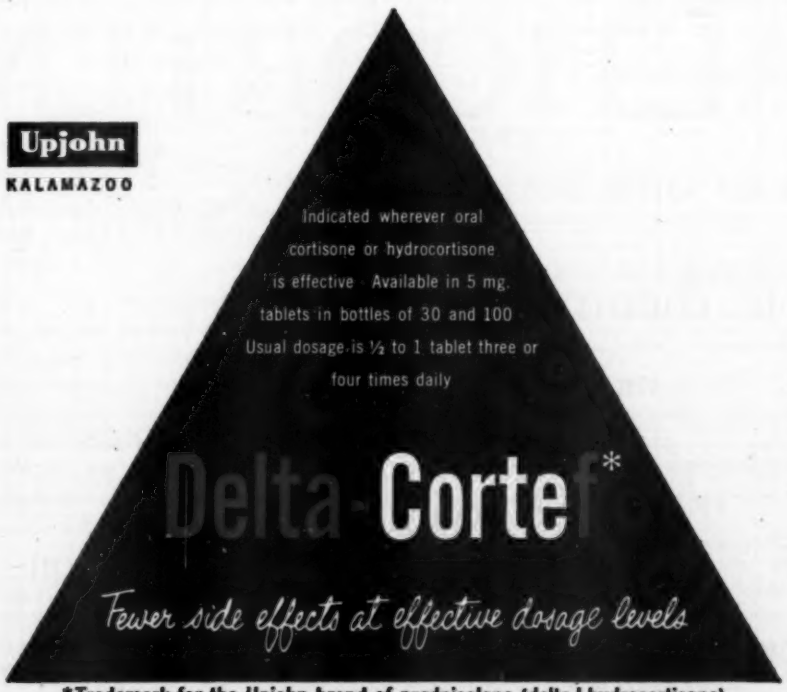
Audiometer tests were carried on in the public schools by 2 other groups. Another auxiliary sponsored a School Health Radio program for the fourth consecutive year. Our largest group again sponsored a money raising project to secure funds for their local child Guidance Clinic and the establishment of a community trust fund.

Probably our most important single honor was realized when Mrs. John Eiserbliss, State Chairman of Public Relations of the Arizona Medical Auxiliary was voted "Woman of the Year" by her community in Phoenix, a city of nearly half a million population.

NURSE RECRUITMENT – The progress of this program in Arizona has been most satisfying, not only in terms of number of students in our Arizona Schools of Nursing, because the 3 Diploma Schools are full, but because we have fed our schools with enough applications so that they have had a better selection and a better screening program, and many applicants have gone to schools of states nearby. This has been accomplished because the key people in our communities, such as counselors, teachers, ministers, newsmen, television and radio personnel,

have been educated to the fact that future nurses are not selected from students who cannot qualify for other professions; but must be of a high mental, moral and physical character. We have cooperated with the Arizona Nurses Association on state and local levels in carrying out this program. The Joint Committee on Careers in Nursing held a Statewide workshop in Phoenix in March. Mrs. Miller, field consultant for the Western Region of the National Committee on Careers in Nursing, was present and gave the summary of the meeting. She was most generous in her praise of the Auxiliary's part in the success of this program. She described our Nurse Recruitment Program as one of the most progressive in the entire country. Our program has been active in the High Schools over the State where we feel that the best source of material is developed in the Future Nurse Clubs. There are 11 active clubs. Nurse Recruitment Week, for the State of Arizona, was proclaimed by the Governor for February 13-20. During this time we placed posters in stores, libraries, post-offices and in buses. The radio and TV publicity was excellent. Editorials, news items and pictures appeared in the newspapers. Each of the three hospitals held open house with almost 600 high school students in attendance. A brochure is being compiled regarding available loans and scholarships for nurses. The interest and enthusiasm that has been manifest in all communities toward Nurse Recruitment has surpassed our highest expectations.

MENTAL HEALTH — Activity in Arizona toward mental health has made remarkable progress during the past year. New, existing and reorganized groups devoted to this problem have been aided greatly both by the County Auxiliaries and by individual members. The role of the County Auxiliary has been (1) educational; (2) financial. The individual auxiliary member has proved a valuable liaison between organized mental health groups and medicine. Because the physician's wife recognizes not only the need for funds for research in this field, but also the dangers of socialism, she is especially valuable as a member of the governing boards of these groups. The State Chairman of Mental Health for the Auxiliary is on the Board of the Arizona Association for Mental Health as are 2 other State Auxiliary Board members. Auxiliary members sit on county boards of both the Phoenix and Tucson Child Guidance Clinics, and were instrumental in the formation of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both of these organizations. A third clinic is being formed in Yavapai County where auxiliary members are active in spear-heading the group. As state president, I discussed "Juvenile Delinquency" on the Mental Health Panel at the Conference of State Presidents and Presidents-Elect held in Chicago in November.

CIVIL DEFENSSE – The state chairman has attended 2 meetings with Federal Region Directors where important aspects of C. D. were explained. County chairman have attended local F.C.D.A. meetings in order to become acquainted with the C. D. problems. Auxiliary members have worked as volunteers with the Red Cross Blood Donor Center and have taught classes in home nursing. In one county an auxiliary member aided the local physicians in setting up casualty clearing stations throughout her city. These are First aid stations which may be put into action after any disaster.

LEGISLATION – The State Chairman sent the names of all County Legislative Chairmen to Central Office to be placed on the A.M.A. Washington Letter mailing list. Early in September she sent personal letters to each county chairman asking that new auxiliary members be contacted and urged to register before the September 27 deadline. She also suggested that an exchange of ideas and problems might be helpful in carrying on legislative programs, and expressed her eagerness to help whenever possible. Material from the National Chairman was sent out in October. In the same envelope copies of the candidate questionnaires, of both U. S. Representatives to be elected, were enclosed together with suggestions on how to go about using this material. Three county auxiliaries devoted an entire meeting to legislation. The members were divided into small groups with leaders to carry on discussion and questions. This idea proved successful in encouraging individual participation.

Another county became so interested in a study of the constitution that 23 of the member-

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ship ordered the book "Your Ruggest Constitution."

Surely a fine start has been made toward cooperation between the State Legislative Chairman and the County Legislative Chairman. In summarizing her year's work the State Chairman says: "It is hoped that the County Auxiliaries will have more enthusiatstic, dedicated members who will "take-on" one of the most important and challenging phases of auxiliary work."

STUDENT NURSE LOAN FUND – Seven students received loans in 1954 with the total amount disbursed being $2,050.00. Twenty-two girls have utilized our funds since the inception of the Student Nurse Loan Fund five years ago. The amount of money in circulation at the present time is $5,650.00. In February, a letter was sent to the principals and vocational directors of all high schools in the State as a reminder of the closing date in accepting applications for 1955. A large number of students have requested application forms and 3 are completed. This interest is probably a direct result of Nurse Recruitment Week, plus the work of our Auxiliary Committee members in the various counties.

TODAY'S HEALTH – The cash award of $40 received from National for placing first in the 400-1000 membership class was used to send subscriptions of Today's Health to American Missionaries in foreign countries. Over 500 subscriptions have been sold in the state, making our state per cent 124.

BULLETIN – All State and County Board members are asked to subscribe to this magazine. It has proved most helpful to the president during the year.

PUBLICITY – The State Chairman met with the president in June to plan the publicity for the year. Each month an article on some phase of the auxiliary program appeared in Arizona Medicine. This report was read at the September Board of Directors meeting. Each member responsible for writing an article for the magazine was notified two months before the date due for publication – all material came in on schedule.

The State Auxiliary president was asked by the State Medical Association to prepare material about the auxiliary to be used in a brochure which will be given to all doctors coming into the state to practice medicine.

REVISIONS – The constitution and by-laws were printed and copies given to each Board member.

AMERICAN MEDICAL EDUCATION FOUNDATION – Special emphasis has been placed on explaining this program to each auxiliary group, with the result that each organized county contributed to the fund. Silver teas, memorials, bridge parties and sales of dish rags provided the means of procuring the money. $289 has been raised.

Records have been brought up to date by a conscientious and efficient historian.

The attendance at the National Convention in San Francisco in June and the Chicago Conference in November proved exceptionally helpful and inspirational. The prompt and efficient manner in which material was dispersed from Central Office made the year intensely interesting and educational.

My sincere appreciation to each member of my Board for her fine cooperation. After much planning, hours of actual work, and miles of traveling, your president ends her auxiliary year with an even greater enthusiastic conviction that the program of the Woman's Auxiliary to the Arizona Medical Association is the most important civic duty of every physician's wife in our state.

Gladys Storts (Mrs. B. P.)
President

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His responsibility for supervising the technical phases of the blood bank program will include visits to all branch banks at frequent intervals in order to determine that requirements of the National Institutes of Health are being met.

A graduate of Harvard Medical School and Syracuse University, Dr. Alsever organized and directed the latter's medical center and blood transfusion service. He also was an instructor in pathology at Syracuse Medical School.

During his long public health service employment, he was director of training and professional standards in the division of hospitals, becoming chief of that division in 1949, and, from last November until May 1, he had charge of hygiene of the aging program, Division of Special Health Services.

As part of his public health service association, Dr. Alsever worked in the blood division program of the Federal Civil Defense Administration, serving most recently as deputy director of the health office.

He is the author of several publications in medical journals in the field of blood transfu-

sions and co-author of the textbook, "Blood Transfusion."

Dr. Alsever resides in Phoenix with his wife and their three children.

ANNUAL ASSEMBLY ENDOCRINE SOCIETY

"ENDOCRINOLOGY and Metabolism" is the subject for the seventh annual Postgraduate Assembly of the Endocrine Society, being held in Indianapolis, Sept. 26-Oct. 1, with the cooperation of the Indiana University School of Medicine.

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Information regarding the program, registration, etc., is available by addressing: Postgraduate Office, Indiana University School of Medicine, 1100 West Michigan St., Indianapolis 7, Indiana.

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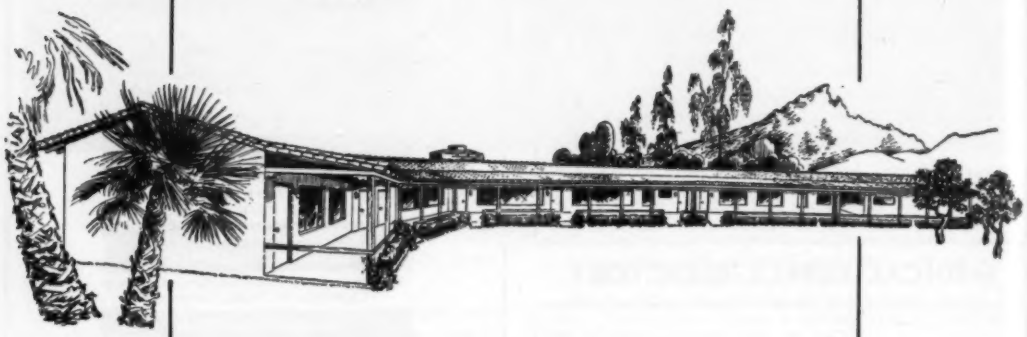

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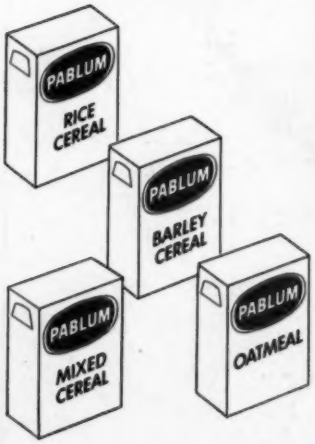

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